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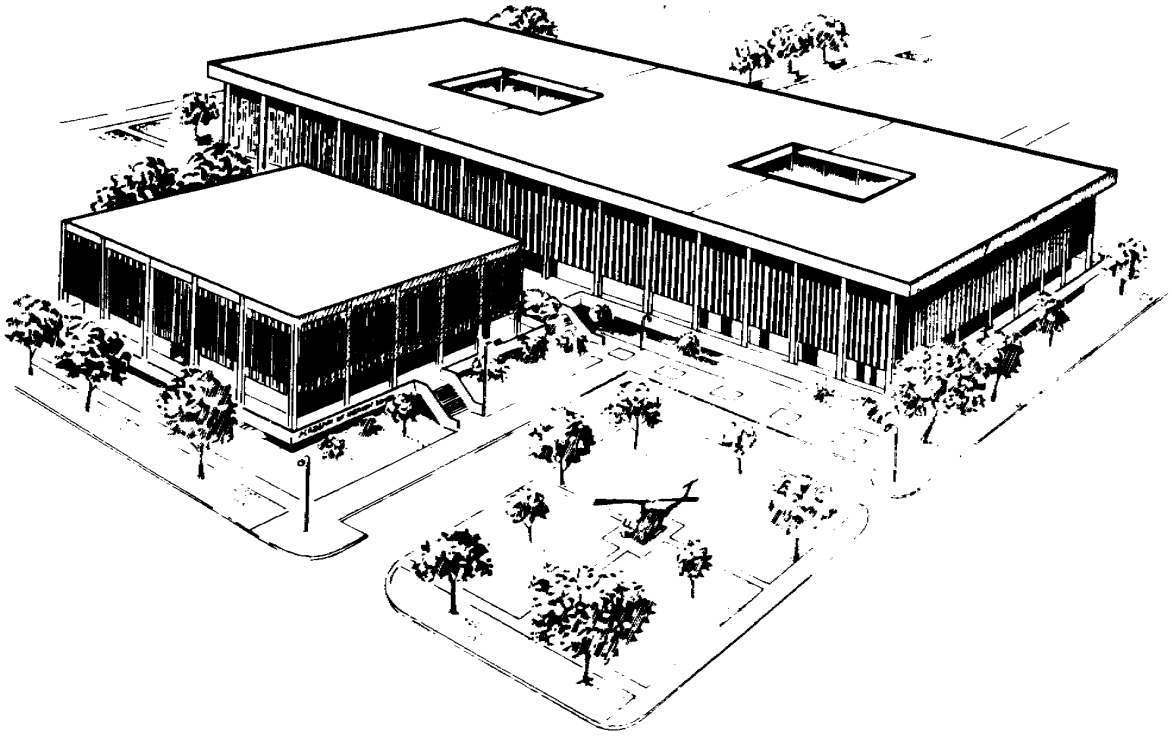
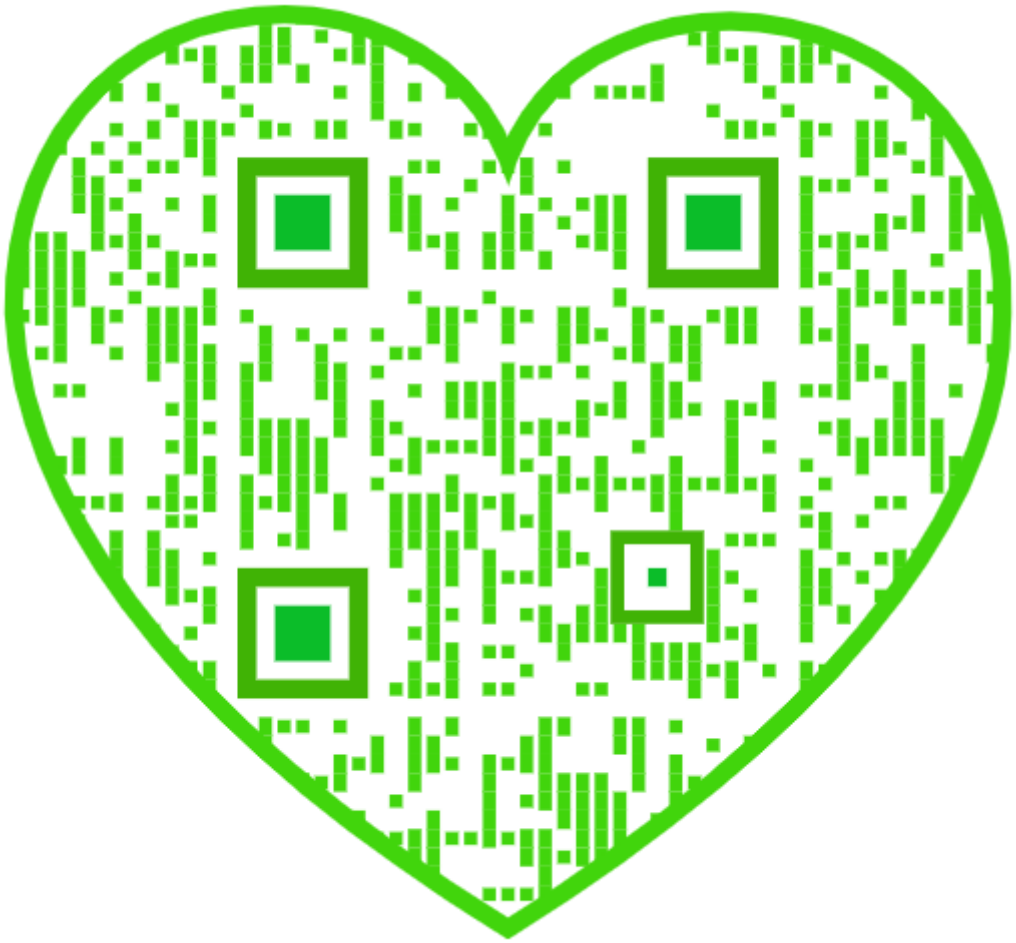


DENTAL INSTRUMENT SETUPS

SUBCOURSE MD0503 EDITION 200



DEVELOPMENT

This subcourse is approved for resident and correspondence course instruction. It reflects the current thought of the Academy of Health Sciences and conforms to printed Department of the Army doctrine as closely as currently possible. Development and progress render such doctrine continuously subject to change.

ADMINISTRATION

Students who desire credit hours for this correspondence subcourse must enroll in the subcourse. Application for enrollment should be made at the Internet website: http://www.atrrs.army.mil. You can access the course catalog in the upper right corner. Enter School Code 555 for medical correspondence courses. Copy down the course number and title. To apply for enrollment, return to the main ATRRS screen and scroll down the right side for ATRRS Channels. Click on SELF DEVELOPMENT to open the application; then follow the on-screen instructions.

For comments or questions regarding enrollment, student records, or examination shipments, contact the Nonresident Instruction Branch at DSN 471-5877, commercial (210) 221-5877, toll-free 1-800-344-2380; fax: 210-221-4012 or DSN 471-4012, e-mail accp@amedd.army.mil, or write to:

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CLARIFICATION OF TERMINOLOGY

When used in this publication, words such as "he," "him," "his," and "men" 'are intended to include both the masculine and feminine genders, unless specifically stated otherwise or when obvious in context.

USE OF PROPRIETARY NAMES

The initial letters of the names of some products may be capitalized in this subcourse. Such names are proprietary names, that is, brand names or trademarks. Proprietary names have been used in this subcourse only to make it a more effective learning aid. The use of any name, proprietary or otherwise, should not be interpreted as endorsement, deprecation, or criticism of a product; nor should such use be considered to interpret the validity of proprietary rights in a name, whether it is registered or not.

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CORRESPONDENCE COURSE OF
THE ACADEMY OF HEALTH SCIENCES, U.S. ARMY

SUBCOURSE MD0503

DENTAL INSTRUMENT SETUPS

INTRODUCTION

In order to obtain maximum benefit from professional capabilities of the Dental Corps, a carefully organized dental service system providing technical and administrative support for professional personnel is necessary. Dental specialists and other auxillary personnel play very important roles in making this possible. A dental officer working with an efficient assistant can provide better and substantially more dental care than by working alone.

The subcourses in the Army correspondence course program for dental specialists are not designed to turn out completely trained personnel. This can be accomplished only by close supervision while in an on-the-job status. The subcourses are designed to provide a review for personnel working in the dental area and provide the basic fundamentals and techniques for personnel interested in the auxiliary dental fields.

This subcourse presents a general discussion of the instruments, their use, and the instrument setups used with the various procedures of dentistry, including basic examination, anesthetic, restorative, surgical, periodontic, endodontic, and prosthodontic.

Subcourse Components:

This subcourse consists of five lessons and two appendixes. The lessons and appendixes are as follows:

Lesson 1, The Basic Examination and Anesthetic Instruments.
Lesson 2, Restorative Instruments.
Lesson 3, Surgical Instruments.
Lesson 4, Periodontic and Endodontic Instruments.
Lesson 5, Prosthodontic Instruments.
Appendix A, Typical Instrument Setups.
Appendix B, List of Instruments Used in Restorative Procedures.

Here are some suggestions that may be helpful to you in completing this subcourse:

--Read and study each lesson carefully.

--Complete the subcourse lesson by lesson. After completing each lesson, work the exercises at the end of the lesson, marking your answers in this booklet.

--After completing each set of lesson exercises, compare your answers with those on the solution sheet that follows the exercises. If you have answered an exercise incorrectly, check the reference cited after the answer on the solution sheet to determine why your response was not the correct one.

Credit Awarded:

Upon successful completion of the examination for this subcourse, you will be awarded 14 credit hours.

To receive credit hours, you must be officially enrolled and complete an examination furnished by the Nonresident Instruction Branch at Fort Sam Houston, Texas.

You can enroll by going to the web site http://atrrs.army.mil and enrolling under "Self Development" (School Code 555).

A listing of correspondence courses and subcourses available through the Nonresident Instruction Section is found in Chapter 4 of DA Pamphlet 350-59, Army Correspondence Course Program Catalog. The DA PAM is available at the following website: http://www.usapa.army.mil/pdffiles/p350-59.pdf.

LESSON ASSIGNMENT

LESSON 1	Basic Examination and Anesthetic Instruments.
LESSON ASSIGNMENT	Paragraphs 1-1 through 1-22.
LESSON OBJECTIVES	After completing this lesson, you should be able to:

1-1. Identify the Army's procedure for identifying dental supplies and equipment.

1-2. Name the four parts of a hand instrument and how each is identified.

1-3. Identify the procedure for identifying dental instruments using Black's classifying method.

1-4. State the three techniques used for sharpening dental instruments.

1-5. Identify the skills required for sharpening dental instruments.

1-6. Identify the purpose and function of each of the dental instruments.

1-7. Name what is included in the basic dental examination setup.

1-8. Name what is included in the sterile pack.

1-9. Identify the three classifications used to describe the dental health for a patient.

1-10. Identify the four functions of medical histories.

1-11. Name the systemic conditions to consider during dental treatment.

1-12. Identify the information revealed by radiography.

1-13. Identify the five functions of study casts.

1-14. Name the procedures for soldiers to use in requesting dental sick call.

1-15. Name the various agents used as an anesthetic.

1-16. Describe the anesthetic syringe.

1-17. Identify the lengths of the disposable needles used with anesthetic syringe.

1-18. List the items included in the anesthetic instrument setup.

1-19. State the procedure for preparing the syringe to administer anesthetic.

SUGGESTION

After studying the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 1

BASIC EXAMINATION AND ANESTHETIC INSTRUMENTS

Section I. INTRODUCTION

1-1. GENERAL

In the age of four-handed, sit-down dentistry, a well-trained assistant is an integral part of dental procedures. Part of your responsibility will be to anticipate the dental officer's next move and have the instruments ready when he needs them. To do this, you must have a thorough knowledge of the procedures the dental officer will follow and of the appropriate instruments used in each of these procedures. Your knowledge, combined with practice, will add to the efficiency of the dental officer and the comfort of the patient. An efficient assistant, it has been shown, will enable the doctor-assistant team to handle fifty percent more patients.

1-2. MILITARY DESIGNATION OF INSTRUMENTS

a. Nomenclature and numbers used to describe Army dental instruments, other dental supplies, and equipment should be familiar to the dental specialist so that proper requisitioning and identification of instruments may be accomplished. Most dental items are listed on the Universal Data Repository (UDR) (Medical Catalog on CD-Rom) as class 6520 items. Each dental instrument listed has a National Stock Number (NSN) that begins with the four digits 6520. Each item is also catalogued according to nomenclature, and many instruments are given individual identifying numbers. For example, a large, straight chisel is listed as follows:

National Stock Number	Item Interpretation	Unit of Issue
6520-00-536-4025	CHISEL, DENTAL, Black, No. 84 (Straight).	Each

b. Other items of equipment, instruments, and supplies used in the dental clinic are primarily medical, surgical, or from one of the other supply classes. These are listed under other classes in the Medical Supply Catalog. The Medical Supply Catalog nomenclature for each type of instrument discussed in this subcourse is listed in capital letters in parentheses following the common or colloquial name of the instrument.

1-3. PARTS OF DENTAL HAND INSTRUMENTS

There are four parts of a hand instrument (figure 1-1). The longest part is the handle where the dental officer holds the instrument when using it. The shank joins the handle and a blade or nib. A cutting instrument has a blade and a cutting edge, whereas a non-cutting instrument has a nib and a face or point. There are identifying numbers on the handles of each instrument. These numbers must be used when the instruments are requisitioned from the supply section.

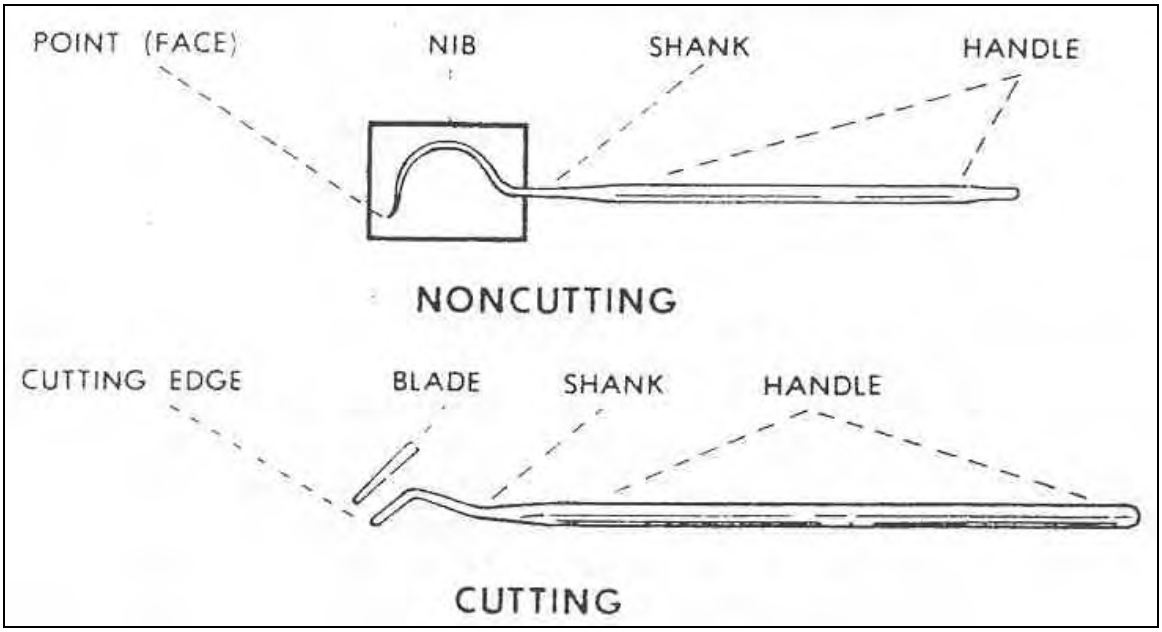


Figure 1-1. Parts of a hand instrument.

1-4. BLACK'S CLASSIFICATION OF INSTRUMENTS

Dr. G. V. Black classified instruments according to ORDER names, SUBORDER names, CLASS names, and SUBCLASS names. Order names denote the purpose for which the instrument is to be used, such as mallet or clamps. Suborder names define the manner or position of use of the instrument, such as hand mallet or molar clamps. Class names describe the working point of the instrument, such as spoon excavator or inverted cone bur. Subclass names indicate the angle of the shank, such as bin-angle. Dr. Black also evolved the instrument formula by which instruments could be readily duplicated anywhere. For example, the number of a gingival margin trimmer is given as 15-95-8-12R. The first two digits (15) of the formula designate the width of the blade in tenths of a millimeter, the third and fourth digits (95) its length in millimeters, and the fifth digit (8) represents the angle which the blade forms with axis of the handle expressed in hundredths of a circle (100 gradations or centigrades). With the instruments in which the cutting edge is at an angle to the length of the blade, the sixth and seventh digits represent the angle made by the edge with the axis of the hand, expressed in centigrades. The handle letter (R or L) signifies that the instrument is one of a pair made in "rights" and "lefts" in order to work more efficiently.

1-5. MAINTENANCE OF CUTTING INSTRUMENTS

Restorative procedures cannot be done adequately without proper maintenance of equipment. Sharp cutting instruments are particularly important and present a continual maintenance problem for the dental specialist. Regardless of what type of cutting procedure (oral hygiene, restorative, or surgical) is to take place, it is very important to have sharp instruments. The dental officer can do a better and more efficient job if he has sharp instruments to work with. You, as a dental specialist, will be responsible for sharpening these instruments. There are three very important reasons for having sharp instruments. A sharp instrument decreases the chance of traumatizing the patient's soft tissue, or of operator fatigue, and, therefore, greatly increases efficiency.

a. **Techniques for Sharpening Instruments.**

(1) The fixed-stone technique. The fixed-stone technique is the first of three techniques for sharpening instruments that we will consider. Fixed stones are unmounted stones. There are two types--hand stones with rounded edges, in cylindrical or rectangular shapes, and flat stones, rectangular in shape, which may be smooth without grooves or have one surfaced grooved lengthwise (see figure 1-2). Equipment for the fixed-stone technique consists of either a Carborundum™ stone or an Arkansas stone, a lubricant, two-inch by two-inch gauze, and, of course, the instrument to be sharpened. The Carborundum™ stone is a soft (artificial) stone that has a coarse grit, thereby limiting it to gross sharpening only. Carborundum™ stones are made in both flat and thin taper shapes. The Arkansas stone is a natural stone and comes in varying hardness. It is a fine stone for obtaining a finished edge. Black Hard is the hardest Arkansas stone. Hard is the next hardest, followed by Soft (good for hunting knives, and so forth) and Washita (most rapid cutting), which has a fine grit, thereby producing a fine edge. Arkansas stones come in varying shapes: flat (grooved on one side), flat on both sides (without grooves), cylindrical, and tapered. The fixed-stone technique has one primary advantage. Use of the fixed stone will remove only minimal metal. However, the technique is messy because of the oil that is required as a lubricant. The oil prevents metal particles from adhering to the stone, reduces friction, thus reducing heat, and aids in producing a fine edge on the instrument.

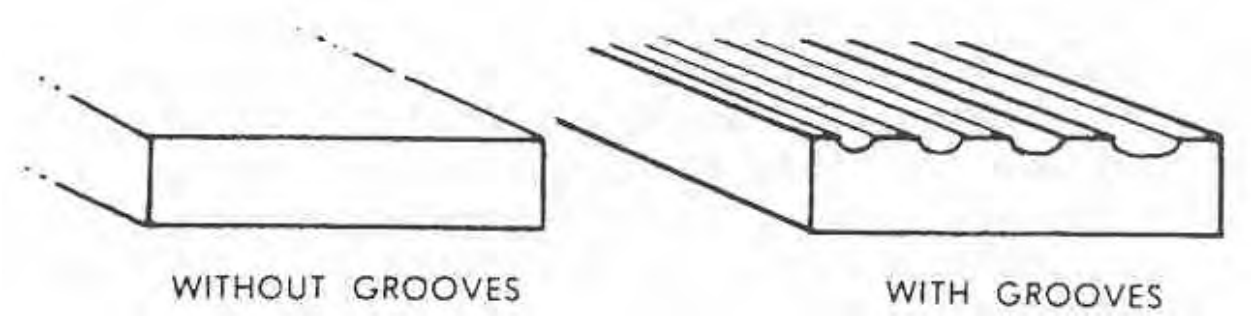


Figure 1-2. Flat sharpening stones.

(2) The mounted-stone technique. The second technique for sharpening dental instruments is the mounted-stone technique. This technique is especially useful in sharpening instruments with curved or irregularly shaped nibs. Equipment consists of mandrel-mounted stones, a straight handpiece, lubricant, two-inch by two-inch gauge, and, again, the instrument to be sharpened. Mounted stones are made of two materials, Arkansas stones and ruby stones (sometimes called sandstones). Ruby stones are primarily composed of aluminum oxide. The ruby stone is comparatively coarse, has a rapid cutting ability, and is used for sharpening instruments that are dull. Mounted stones are cylindrical in shape and appear in several sizes. They have a fine grit and are used with the straight handpiece. The stones permit rapid sharpening, but without extreme care, will remove too much metal and may overheat the instrument. Overheating the instrument will destroy the temper, thereby causing the instrument to no longer hold a sharp edge.

(3) The rotary-hone technique. The rotary-hone technique is the third technique of sharpening instruments. The rotary hone was invented by Dr. E. L. Kirkpatrick of Marquette University and it is called the E.L.K. Rotary Hone. The equipment for this technique is the same as for the mounted-stone technique with the addition of the hone itself. The hone attaches to the straight handpiece and provides a table serving as a rest and a guide for the instrument. The advantages/disadvantages of the rotary-hone technique are the same as that of mounted stones. However, greater control of the instrument is provided by the table. Oil is used as a lubricant with this technique as recommended by the manufacturer.

b. **Instrument Sharpening Principles.** Certain principles of instrument sharpening MUST be adhered to in order to properly sharpen an instrument.

(1) Establish the proper angle. Before starting to sharpen, establish the proper angle between the stone and the surface to be ground. The plane of the surface being ground should be used as a guide. Sharpening entails reducing the surface of the blade in relation to the dull edges; to accomplish this, reduce the entire surface--do not create a new bevel at the cutting edge. Do not tilt the stone so that it cuts unevenly across the surface being ground.

(2) Lubricate the stone. Always lubricate the stone while sharpening. This avoids unnecessary heat, as indicated earlier, which changes the temper of the instrument, making the steel softer. Avoid excessive pressure. This heats the edge, even though the stone is lubricated. A light touch is essential. Sharpen the instrument at the first sign of dullness.

(3) Wear safety glasses. Finally, the most important principle or precaution is to always wear safety glasses, especially when using the mounted-stone or rotary-hone techniques. The metal particles and the lubricant will be flying through the air and inevitably will strike eyes or face; so be sure the wheel is rotated away from you. The safety glasses are for your protection. WEAR THEM!

c. **Testing For Instrument Sharpness.** Two methods of testing instruments for sharpness are available--the light test and the thumbnail test.

(1) The light test. This test requires that you look directly at the sharpened edge. A shiny edge indicates that the instrument is dull, while a sharp edge will appear as a black line. A sharp edge will not reflect light caused by the fine line that appears as sharpness is achieved.

(2) The thumbnail test. This test is the more reliable of the two tests. Hold the sharpened edge of the instrument at a 45º angle to the nail. Using light pressure, push or pull the instrument (as dictated by the function of the instrument). If the instrument slips or glides along the nail, it is still dull. If the instrument grabs or shaves the nail, a sharp edge has been restored.

NOTE: Figures 1-3 through 1-7 illustrate instrument sharpening.

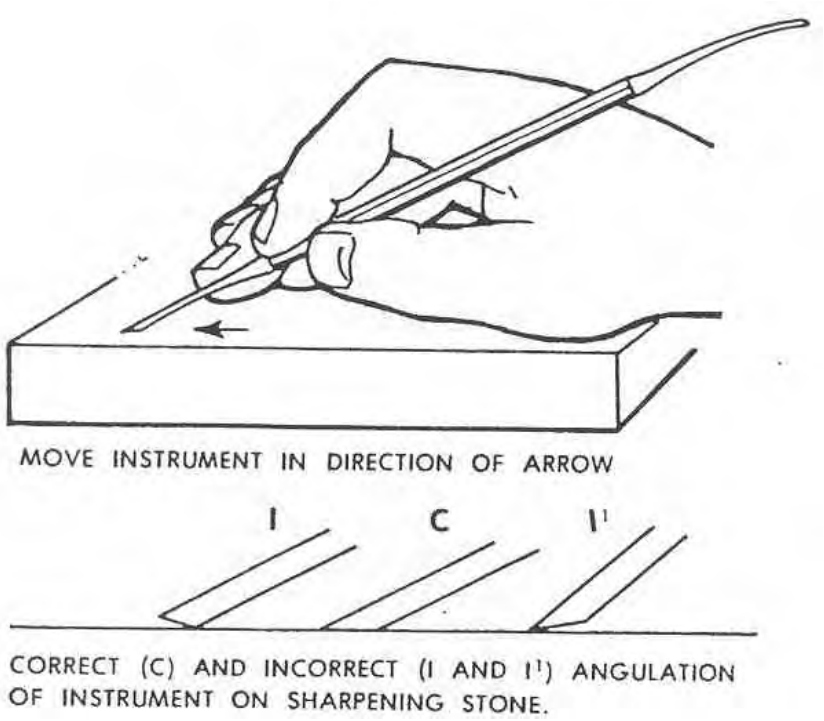
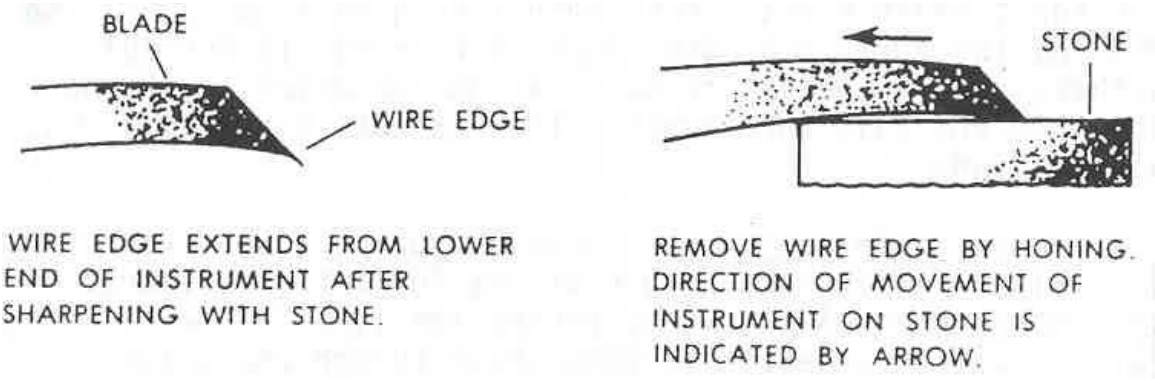


Figure 1-3. Proper angulation for sharpening an instrument.


BLADE
WIRE EDGE
WIRE EDGE EXTENDS FROM LOWER END OF INSTRUMENT AFTER SHARPENING WITH STONE.
STONE
REMOVE WIRE EDGE BY HONING. DIRECTION OF MOVEMENT OF INSTRUMENT ON STONE IS INDICATED BY ARROW.

NOTE: Using a hand stone, the instrument should be stabilized while being sharpened. the instrument is placed so the inner concave surface is upward and parallel to the floor. The stone is placed on the inner surface of the blade at its junction with the shank and then moved back and forth in a sawing motion until it reaches the tip. The outer surface is honed slightly to remove the wire edge.

Figure 1-4. Removing wire edge from instrument.

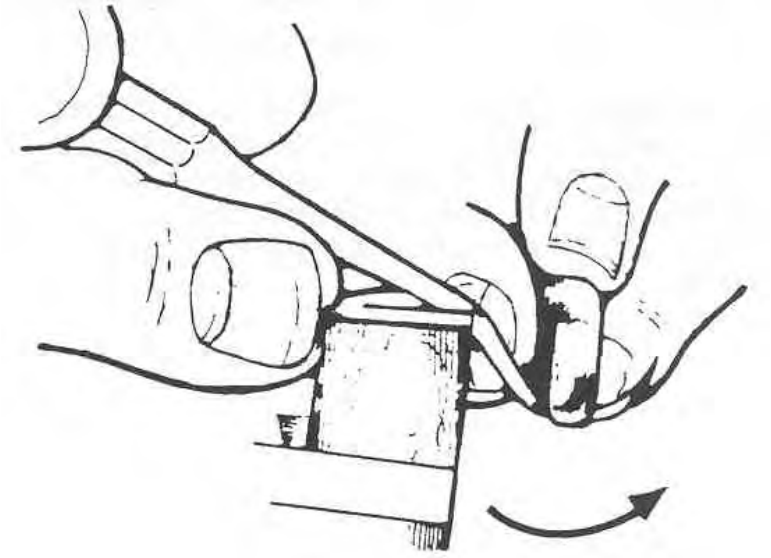
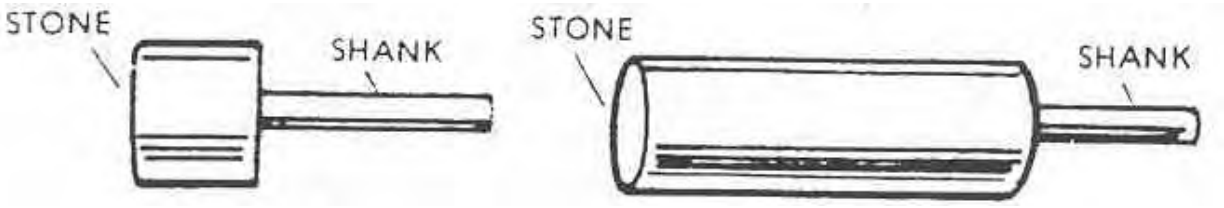


Figure 1-5. Sharpening an instrument using a hand stone.



NOTE: Using a mounted stone, the instrument is held in a palm and thumb grasp, with the inner concave surface facing upward, and the tip toward the dental specialist. The stone is made to revolve slowly in the handpiece. Place the slowly revolving stone against the inner surface of the junction of the blade and the shank and draw it slowly toward the tip until it passes off the scaler. Both lateral edges will be sharpened simultaneously.

Figure 1-6. Mounted sharpening stones.

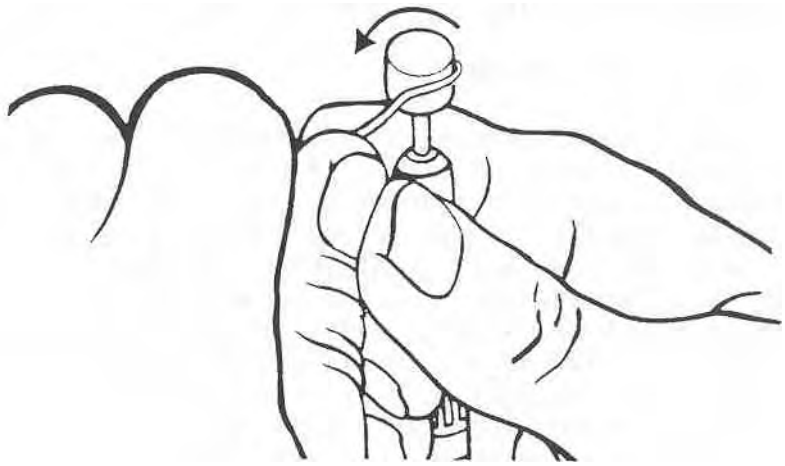


Figure 1-7. Sharpening an instrument using a mounted stone.

Section II. THE BASIC ORAL EXAMINATION

1-6. THE ORAL EXAMINATION DIAGNOSIS SERVICE

The oral examination and diagnosis service of a dental clinic usually sees the patient first, either for initial dental examination or for expedient or emergency treatment. Since radiographs are needed for most examinations to make an accurate diagnosis, the oral examination and diagnosis and radiographic services are often combined. The oral diagnostician in developing treatment plans will often consult dental officers in the other dental specialties and medical officers in certain medical specialties. He may use the medical laboratory and the medical radiographic section for pathological, bacteriological, cytological, or other medical diagnostic methods to develop the best treatment plan.

1-7. SCOPE OF ORAL DIAGNOSIS

Diagnosis is the process of identifying a disease or disease process from a study of its appearance and effects. Since the patient is not always aware of the presence of disease, recognition must often precede diagnosis. For this reason, both periodic physical and dental examinations are required for Army personnel. Dental examinations result routinely in the diagnosis of dental caries and periodontal disease, but the dental officer does not limit his examination to dental and periodontal tissues. Because of his training, the dental officer has the responsibility of diagnosing localized diseases of the lips, the tongue, the oral mucosa, and the salivary glands and diagnosing changes in such tissues that are indications or extensions of diseases at other locations in the body. Many systemic diseases present early oral manifestations that are discovered during routine dental examination. Thorough examination of oral tissues occasionally results in the discovery of malignant, potentially malignant, or other serious lesions. Early recognition of these conditions permits early, more effective, and more conservative treatment, resulting in a more favorable prognosis.

1-8. FACILITATING PATIENT TREATMENT

No matter what type of procedure the dental officer is about to perform--amalgam restoration, root canal, or even oral surgery--he must also perform preliminary procedures. In order to check the condition of the patient's oral cavity and to see if any changes have taken place since the last visit, he conducts a basic dental examination. Secondly, the dental officer will need to administer an anesthetic prior to most restorative or surgical procedures. The equipment, materials, and instruments used during an examination or used for administering anesthesia are the topics for discussion in this lesson. As a dental specialist, your primary goal is to facilitate the treatment of patients,. Having the proper basic examination instruments ready and the anesthesia items assembled for use will result in overall decreased chair time, help lessen patient apprehension, and provide for quicker and more efficient treatment. As a quick reference, the items in a typical setup are listed in Annex A.

1-9. INSTRUMENTS

a. **Mouth Mirrors (MIRROR, MOUTH EXAMINING)**. Mouth mirrors (figure 1-8) enable the dental specialist and the dental officer to see, by reflective vision, surfaces of tissues and teeth that cannot be seen with direct vision. They aid in reflecting light into dark areas in the mouth so tissues and teeth may be more readily seen. They can be used to retract soft tissues of the cheek, tongue, and lips. There are two general types of mouth mirrors: plane glass mirrors in which the reflected image is the same size as the object being viewed and magnifying mirrors in which the reflective image provides an enlarged view. The type of mirror used depends on the preference of the dental officer. Mirrors are screwed to their handles at an angle to facilitate viewing and to permit replacement after the mirror has become ineffective.

Figure 1-8. Mouth mirror.

b. **Explorers (EXPLORER, DENTAL)**. Explorers (figure 1-9) are sharp, pointed metallic instruments so designed that the various surfaces of teeth may be conveniently reached with the explorer point. Three different explorers are commonly used in the Army Dental Service. One, the number 23 explorer, ends in a semicircle tapering to a point at its distal end. The working end of the other two explorers, numbers 6 and 17, are shorter, straight, and at an angle to the handle. These instruments are used for diagnostic purposes based on the sense of touch and on mechanical penetration of defects in tooth surfaces. Some diagnostic purposes are given below.

(1) Locating caries and enamel defects on the interproximal, occlusal, and other surfaces that are difficult to see by direct vision.

(2) Locating subgingival calculus.

(3) Locating of faulty margins on dental restorations.

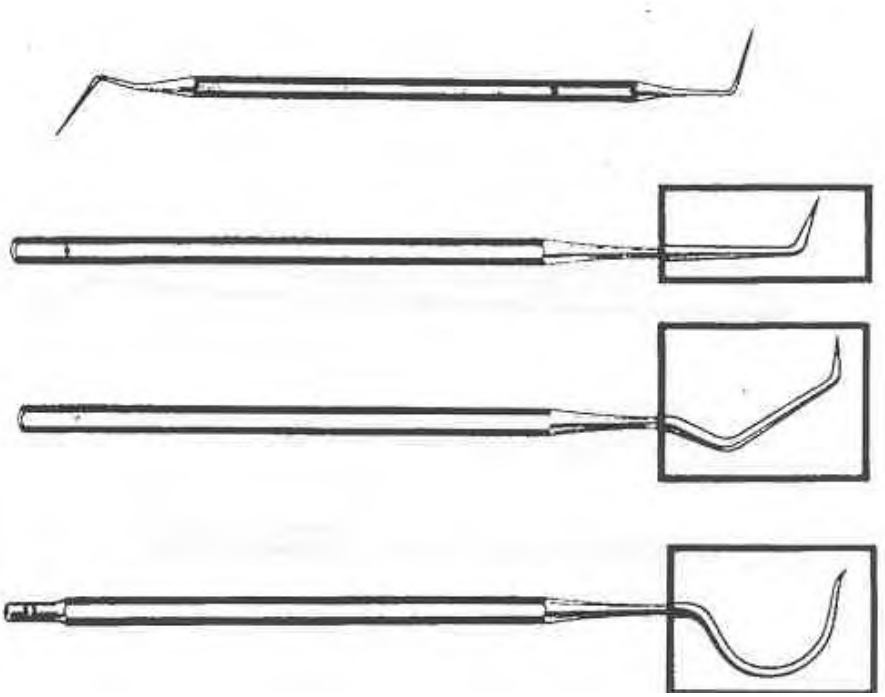


Figure 1-9. Explorers.

c. **Cotton Pliers (FORCEPS, DRESSING).** Cotton pliers (figure 1-10) are tong-like, metallic instruments. The working end of a pair of cotton pliers consists of two tapered opposing portions that form a 60 degree angle with their handle. Cotton pliers are used for handling cotton pellets, cotton rolls, small instruments, or other small items placed into or withdrawn from the mouth. The pliers are also used to carry liquid medication between the closed beaks for deposit in areas of the mouth or teeth.

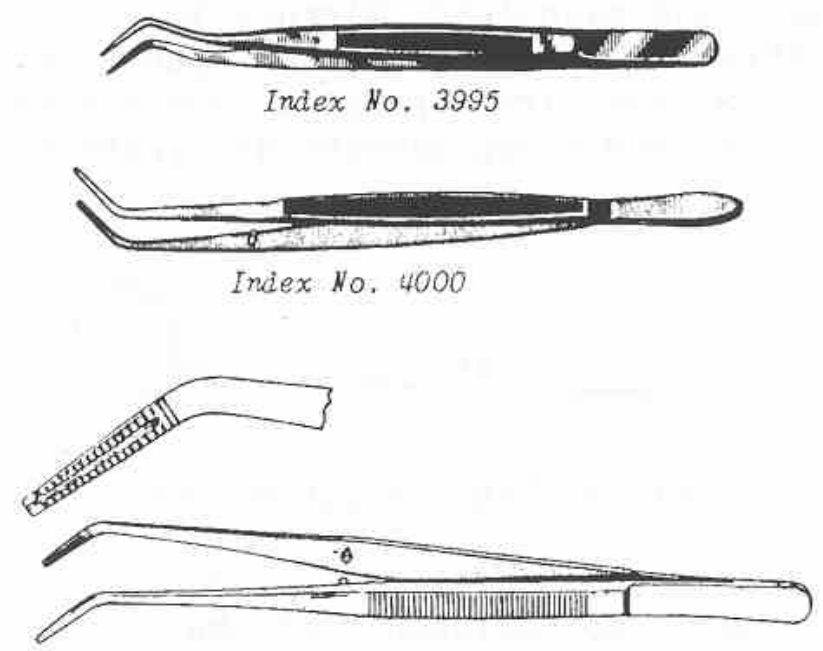


Figure 1-10. Cotton pliers.

d. **Periodontal Probes (PROBE, PERIODONTAL)**. Periodontal probes (figure 1-11) are non-cutting instruments used to determine the depth and outline of soft tissue pockets. Most are single-ended; some are double-ended. A periodontal probe has a handle, a rounded nib, and a point (or face). The angle of the nib will vary according to the intended use. The nib is marked with graduations that correspond to millimeters.

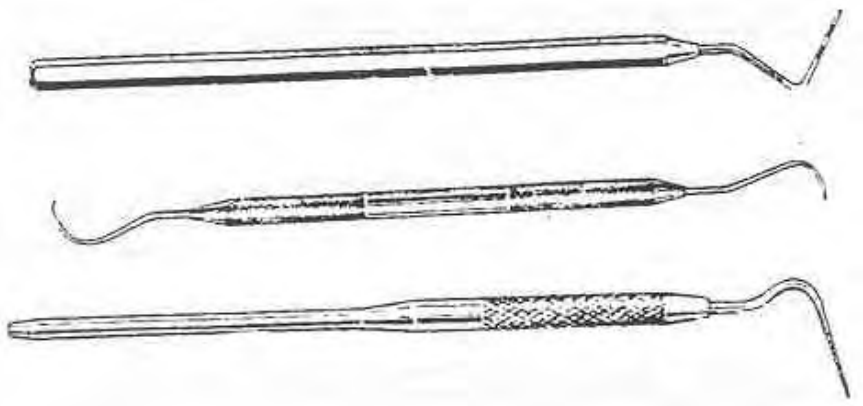


Figure 1-11. Periodontal probe.

e. **Saliva Ejectors (MOUTHPIECE, SALIVA EJECTOR, DENTAL)**. Saliva ejector mouthpieces are made to be attached at one end to the saliva ejector tubing on the dental unit. The other end rests in the mouth for the evacuation of saliva, blood, water, or debris during dental procedures.

f. **Pulp Tester (TESTER, PULP, DENTAL).** A pulp tester (figure 1-12) is a standard instrument for use in the oral diagnosis service. This instrument is used to determine the vitality of the tooth being tested by passing a small amount of electrical current from the pulp tester to the tooth. The amount of current necessary to obtain a reaction aids the dental office in determining the vitality of pulp. To perform this procedure, the dental officer will isolate the tooth to be tested with cotton rolls and dry the tooth with a warm air syringe. He will apply toothpaste or fluoride gel to the tip of the pulp tester. This paste acts as an electrical conductor and ensures good contact with the tooth. Next, the dentist applies the tip of the pulp tester to the tooth. The tester will automatically start at 0 and slowly increase the current until the tester reads 80. Normally, a vital tooth will respond to the electrical stimulus at some point between 5 and 80. Eighty is the maximum current level on the pulp tester and indicates that the pulp is nonvital. Because of the plastic covering, the tip of the pulp tester should be disinfected and not heat sterilized.

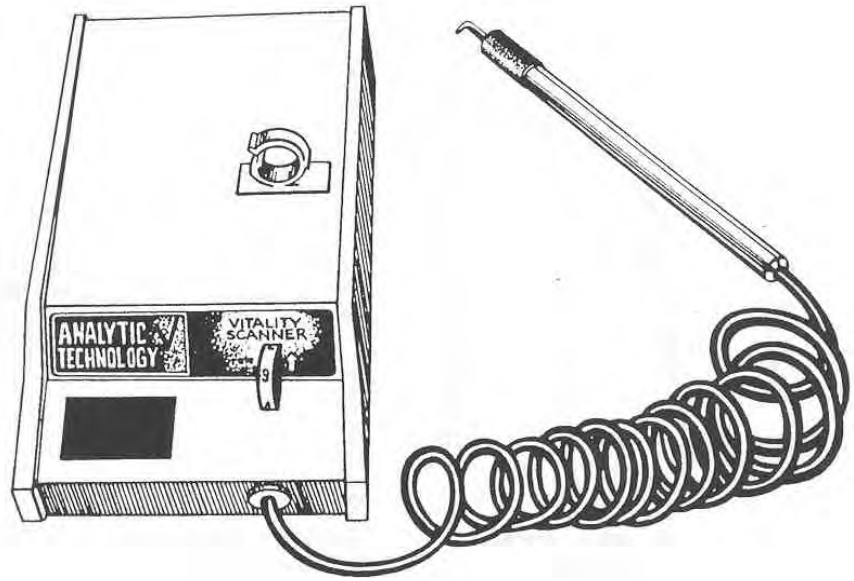


Figure 1-12. Pulp tester.

1-10. BASIC DENTAL EXAMINATION SETUP

a. **The Setup**. The basic dental examination setup (figure 1-13) consists of a mouth mirror, cotton pliers, explorer, periodontal probe, cotton dispenser with cotton, two-by-two-inch gauze pads, and a saliva ejector. This equipment is used in almost every dental treatment procedure. The water and air syringes are frequently used to remove debris and fluids from tooth surfaces so that they may be examined more accurately. A good light source is also essential to adequate vision in performing any oral diagnostic procedure.

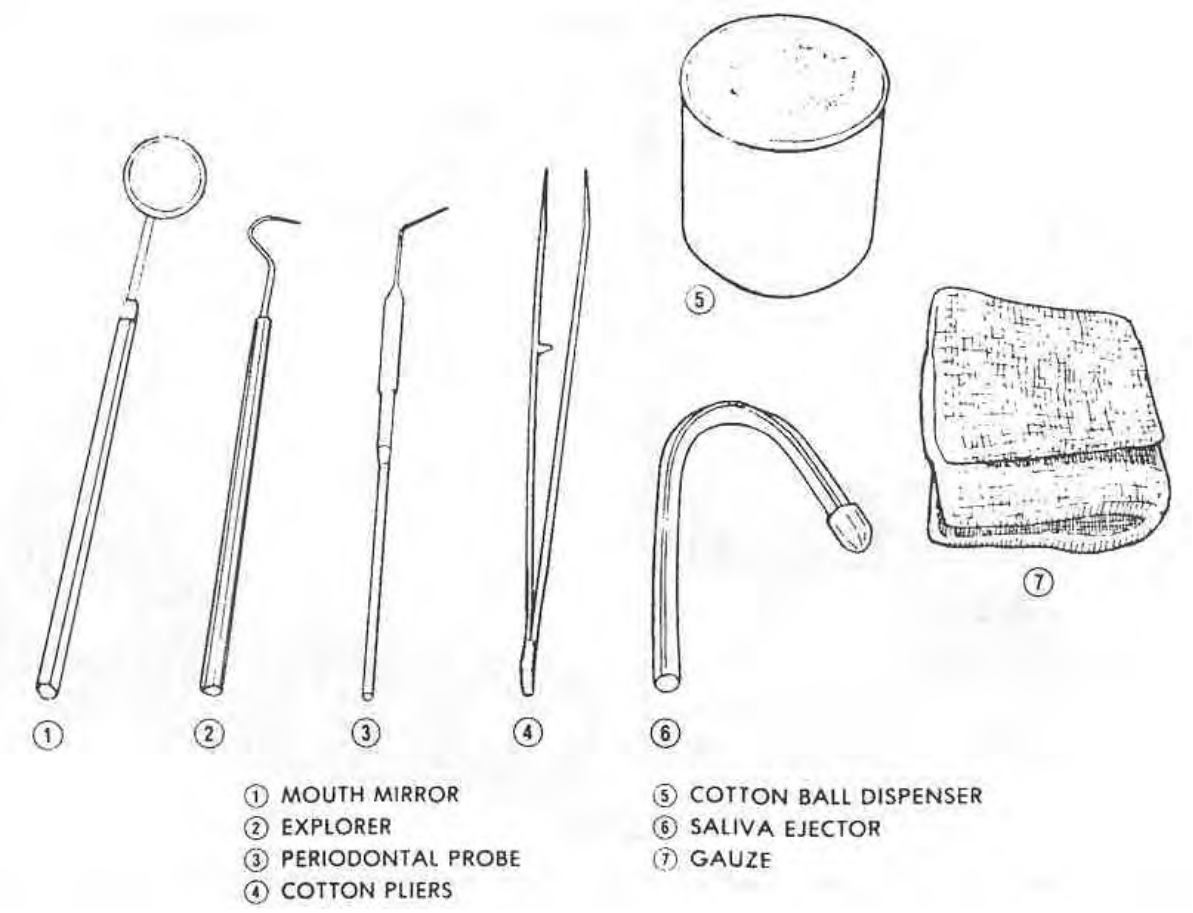


Figure 1-13. Instruments and materials for basic examination.

b. **The Sterile Pack**.

(1) Certain instruments are required for each type of dental procedure. In order to facilitate the work being done, these instruments can be prepared in advance. Possibly days, or even weeks, before the actual operation is performed, the dental assistant can wrap the proper instruments in a pack (usually paper or muslin) and autoclave them. These sterile packs can then be stored and used whenever necessary. This method will save both time and space in the dental clinic. The pack used most frequently contains the basic examination instruments, with the exception of the saliva ejector. These could be prepared long in advance since a basic examination is common procedure for all types of dental work. Remember, though, that the type of material in which the instruments are autoclaved determines how long they will remain sterile.

(2) The instruments found in the basic examination sterile pack is the explorer, (number 6, number 17, or number 23), the mouth mirror, the periodontal probe, cotton pliers, and 2x2-inch gauze pads.

Section III. STANDARD PROCEDURES

1-11. THE TEAM APPROACH: DUTIES OF THE DENTAL SPECIALIST

The dental specialist in the oral examination and diagnosis service performs common duties applicable to all dental specialists. Because of the relationship of this service to the reception office and to the radiographic service of the dental clinic, the dental specialist works closely with and may even perform part of the duties in the administration and management branch and radiographic sections. For these reasons, the dental specialist must be familiar with the duties and functions of all these sections. In addition, personnel in the oral examination and diagnosis service must consult frequently with each professional service of the dental clinic and with diagnostic servi+ces of the hospital. The dental specialist must be familiar with clinical and hospital routine to the extent that maximum assistance is afforded in routine dealings with other sections and services. These duties are related to the efficient functioning of the oral medicine and treatment planning service itself. Organization of procedure is necessary to ensure that emergency cases are seen first and that all patients are seen in an orderly, smooth-flowing manner with minimum delay. Efficiency depends upon the establishment of routines for recording examinations, handling records, maintaining a supply of sterile instruments, obtaining radiographs, making appointments, and referring patients to other services as indicated. The dental specialist should be sufficiently competent to relieve the dental officer of all but strictly professional aspects of these routines.

1-12. ORAL EXAMINATIONS

a. **Classification.** Direct examination of the teeth and oral tissues is the procedure used most in determining the status of oral health. Four classifications are used to describe the dental health of active duty service members. Dental classifications are described in more detail in AR 40-66, Medical Record and Quality Assurance Administration.

(1) Class 1. Personnel who require no dental treatment.

(2) Class 2. Personnel whose existing condition is unlikely to result in a dental emergency within 12 months.

(3) Class 3. Personnel that require dental treatment to correct a dental condition that is likely to cause a dental emergency within 12 months. Class 3 includes patients who have deep caries, a fractured tooth, or pericoronitis (infection around a wisdom tooth).

(4) Class 4. Personnel who have missed two annual exams or whose status is unknown.

b. **Records.** As in all patient treatment areas, the dental specialist in the oral medicine and treatment planning service should ensure, when treating the patient, that the correct records for the patient have been provided. As the dental officer conducts the examination, he will state his initial findings and the dental specialist will record these findings on applicable charts and sections of the various forms used. The dental specialist in the oral medicine and treatment planning service must be proficient in recording examinations and know the provisions of publications that cover prescribed forms, know authorized terms and abbreviations, know methods of recording, and know dental classifications. The publications covering dental examinations and records are AR 40-3, AR 40-501, and TB MED 250.

1-13. MEDICAL HISTORIES

a. **General.** Any dental examination includes taking and recording the patient's medical history. The medical history may be brief or detailed, depending upon the findings and observations made during the examination. The history consists mainly of information pertinent to the conditions revealed during the examination and is obtained from the patient by questions asked by the dental officer. A medical history should be updated at every appointment.

b. **Importance of Medical Histories.** The following are four important functions of patient medical histories.

(1) Provide important information that assists the dental officer in arriving at a diagnosis.

(2) Provide information on conditions that might lead to complications during treatment procedures if not previously recognized.

(3) Establish good rapport with the patient.

(4) Provide a good opportunity for patient education.

c. **Taking and Recording Histories.** Pertinent information brought out while taking the patient's history should be recorded in writing. In taking a history, the dental officer often has an established routine that he conscientiously follows so that no possible information is overlooked. He may take brief notes and later write the summary to be recorded or transcribed as part of the patient's record.

d. **Ethical Aspects.** Information given by the patient to the dental officer is confidential and is used to enhance professional care. The dental specialist will not reveal confidential information to any person not concerned with the patient's medical or dental health.

e. **Medication.** The dental officer, during an initial examination and before starting any dental treatment, routinely asks a patient if he is taking any medication. If so, a notation is made on the record as to the type and amount of drug being taken. Special considerations in providing dental treatment and in prescribing additional drugs will be determined from this information.

f. **Medical Treatment.** During a dental examination, the dental officer asks the patient if he is under medical treatment and, if so, for what particular condition. This will enable the dental officer to determine the best plan for dental treatment.

g. **Systemic Conditions.** There are a number of oral manifestations of systemic diseases, if discovered while taking the medical history, which must be considered carefully in planning and carrying out the course of treatment. Because of physical standards for active military duty, these conditions are not as common in the military community as in other segments of the population. Some of these conditions, including potential dangers and precautions to be taken, are given below.

(1) Congestive heart failure. Patients with congestive heart failure have hearts that have been weakened to the extent that they can no longer fulfill the body's demands. A physician is usually consulted before oral surgery or other dental treatments are performed.

(2) Rheumatic heart disease. Rheumatic fever is a disease that may affect the valves of the heart. Heart valves that have been damaged (rheumatic heart disease) by rheumatic fever are susceptible to infections from bacteria that could be forced into the bloodstream during extraction of teeth or other dental procedure. Should a patient with a history of rheumatic fever require dental care, the dental officer will normally consult the patient's physician and institute prophylactic antibiotic treatment before performing the indicated treatment.

(3) Coronary artery disease. Patients with coronary artery disease (disease of the arteries that supply blood to the heart) may experience pressure or pain in the chest called angina pectoris. Pressure or pain occurs when narrowing of the coronary arteries prevents adequate oxygen to the heart muscles. Attacks may be brought on by nervousness and physical or emotional stress. Patients with a known history of angina pectoris should be treated only after every precaution has been taken to minimize nervousness and stress. Usually, a physician is consulted before these patients are treated. The patient who has angina pectoris usually carries his own supply of nitroglycerin.

(4) High blood pressure (hypertension). The dental officer normally will consult the patient's physician before surgery or any extensive dental treatment on a patient with elevated blood pressure. Premedication, selection of the anesthetic agent, and the duration and nature of anticipated surgery or dental manipulation all require careful consideration.

(5) Diabetes mellitus. Diabetes is a systemic disease in which the body is unable to utilize sugars in the diet because of the lack of insulin in the system. Diabetes may be controlled by periodic injections of insulin, oral medication, or diet, depending on its severity. Periodontal disease is often associated with uncontrolled diabetes. Special consideration must be given in performing surgery or any dental treatment on diabetics because of their tendency to bleed easily and their high susceptibility to infections. The dental officer normally will not perform extractions on uncontrolled diabetics unless the patient's physician assumes responsibility and supportive measures have been employed.

(6) Hemophilia. Hemophilia is a rare hereditary condition appearing in males. In hemophilia, there is profuse bleeding caused by an inadequate clotting mechanism resulting in prolonged uncontrollable bleeding, even from the slightest cut. Any necessary surgical procedures should be done only with the cooperation of the patient's physician to minimize and to control bleeding.

(7) Pernicious anemia. Pernicious anemia is a severe form of anemia characterized by lowering red blood cell count, weakness, and other forms of debilitation. One frequent early symptom is a painful, fiery red inflammation of the tip and sides of the tongues. The wearing of dentures or any other mild mechanical irritations cannot be tolerated by some patients with pernicious anemia.

(8) Allergy and hypersensitivity. Patients may be allergic or hypersensitive to any of a number of drugs or materials used in dentistry. The dental officer must take a thorough history, so that he may avoid the use of drugs and materials to which the patient may have an unfavorable reaction.

(9) Hyperthyroidism. Hyperthyroidism is a disease in which the thyroid gland is abnormally active and produces marked systemic effects. Among these effects are pronounced nervousness and emotional instability, cardiovascular changes, weakness, and other symptoms. Extensive or painful oral operations or the use of agents containing adrenalin is contraindicated in the active hyperthyroid cases. The patient's physician normally will be consulted before an oral operation is performed on the patient. The hyperthyroid patient on adequate medication can become a well-stabilized dental patient.

(10) Hepatitis B. Patients with active hepatitis, or who are carriers of the Hepatitis B virus, can infect the dentist, staff, and other patients. To reduce risk to everyone, strict barrier protection procedures must be enforced (masks, gloves, gowns, and protective eyewear) along with strict aseptic techniques. Hepatitis is a very debilitating disease and causes death in a small percentage of the cases. Therefore, it is recommended that all dental personnel receive the heptavax vaccine to eliminate risk of infection with the Hepatitis B virus.

(11) HIV infection. Human immunodeficiency virus (HIV) infection, or AIDS as it was originally called, causes death by destroying the patient's immune system. More simply, the patient dies from an infection because the body's defense system does not work. This virus is very difficult to transmit from one person to another. A dental care provider cannot contract an HIV infection through daily contact at the workplace. The HIV infection enters the bloodstream by having sex with an infected person or by shooting drugs with a needle or syringe that has been used by an infected person. If you work on an HIV positive patient, the patient is many more times at risk than you are. The reason is the patient's immune system cannot easily control new and different infections. It is important, then, to have extremely strict aseptic procedures before, during, and after patient care. This reduces the risk to the HIV patient and the possibility of risk to other patients and the dental care providers.

1-14. RADIOGRAPHS (X-RAYS)

a. **General.** Radiographs are indispensable aids in diagnosing many conditions existing within the teeth, bone, or tissues that are not apparent on clinical examination. Information revealed by radiographs includes the following:

(1) Infection and abscesses within the bone and about the roots of the teeth.

(2) Size and shape of roots of teeth to be extracted.

(3) Carious lesions that cannot be detected in other ways.

(4) Condition of the periodontal bone.

(5) Condition of teeth and bone that have been considered for the support of fixed or removable prosthodontic appliances.

(6) Presence of impacted teeth, supernumerary teeth, or retained roots.

b. **Recording Radiographic Findings.** Radiographs are usually completely processed before they are interpreted. This often takes place after the examination. If emergency treatment is indicated, the dental officer may request a "wet reading." At such times, the radiographs are processed enough to obtain suitable image for interpretation and diagnosis and remain attached to the radiograph hanger. Radiographs that have been completely processed and mounted are interpreted by the dental officer when he is not engaged in examination or treatment procedures. The dental specialist must see that the radiographs are properly mounted and available for the dental officer for interpretation and must be able to record radiographic findings on dental health records. Radiographs should be kept in the dental health record until they are no longer needed.

1-15. REQUEST FOR CONSULTATIONS

a. **Within the Dental Service.** The different services of the dental clinic will ordinarily be represented by dental officers having specialized training or ability. The dental officer in the oral medicine or treatment planning service often will consult one or more of these dental officers with particular specialties to aid in the diagnosis of a particular problem or implementing a course of treatment. It is important that pertinent information obtained from these sources be recorded in the appropriate dental forms. DA Form 3984 (Dental Treatment Plan) provides the opportunity to request consultation and includes room for the consultant's remarks and recommendations. The treatment plan provides systematic approach to clinical care. The form is retained as part to the patient's dental health record until the dental treatment plan has been accomplished or has been replaced. Detailed instructions for the preparation and maintenance of the dental treatment plan are found in TB MED 250.

b. **Referral To and From Other Sources.** The dental officer may wish to consult a medical officer about a patient, or a medical officer may initiate a request for dental consultation. A standard form available for this purpose is SF 513 (Clinical Record--Consultation Sheet). The attending dental officer initiates this form in duplicate. He may discuss the case with the consultant or take the patient to the consultant. The medical officer initiates the request for dental consultation from the hospital ward. If this consultation is limited to examination, no entry is required on SF 603 (Dental Health Record). However, when dental treatment is provided because of this consultation, such treatment must be recorded and charted on the patient's SF 603 in order to maintain an accurate dental health record of that patient. Prolonged treatment in the hospital for a single dental condition, such as a fractured jaw, need not be recorded in detail on SF 603. In most cases, a summary of the condition will be recorded on SF 603 by the attending dental officer. The completed SF 513 is returned to the referring activity or the hospital ward and is a permanent part of the patient's hospital clinical record upon completion of the dental consultation.

1-16. STUDY CASTS

a. **Definition.** Study casts are another aid in examination and diagnosis. They are plaster or artificial stone casts poured in accurate impressions of the dental arches. These are often mounted on an anatomic articulator (articulator which may be adjusted to reproduce the movement of the jaw).

b. **Function.** Study casts are used to:

(1) Permit study of alignment and occlusal relationships of the teeth outside the confines of the patient's mouth.

(2) Permit coordinated study of the teeth and radiographs after the patient has left the office and the radiographs have been processed and dried.

(3) Provide a duplication of the mouth, which is useful in consultations with other dental officers.

(4) Provide a permanent record of oral conditions as they existed prior to treatment.

(5) Provide a media upon which proposed treatment procedures, such as spot grinding for occlusal equilibration or the fabrication of prosthetic appliances may be studied.

1-17. DENTAL SICK CALL

Dental sick call is a provision made to enable authorized personnel to request needed dental service in the absence of a dental appointment. In many clinics, a definite period during the day is set aside for dental sick call. Those who are suffering from pain, injury, infection, or situations that may be called a dental emergency may be seen at any time (a dental officer of the day and often a dental charge of quarters are available during other than normal duty hours). All persons reporting to the dental clinic for routine or emergency dental care are ordinarily given a dental examination before an appointment or treatment is given. This means they are first seen by personnel of the oral medicine and treatment planning service. Certain conditions will be treated in this section. Some of these emergency situations may include gingival treatments, incision and drainage of abscessed areas, and perhaps a tooth extraction, a denture repair, or the placement of temporary restorations and sedative fillings. The dental specialist in the oral medicine and treatment planning service should be familiar with the drugs, equipment, materials, and the assisting procedures used to accomplish the treatments. Small clinics having no specific oral medicine and treatment planning service will have some arrangement by which dental officers will rotate on a schedule to manage sick call patients. In this instance, the dental specialist assumes an even bigger task in coordinating this effort.

1-18. INDIVIDUAL SICK SLIP

DD Form 689 (Individual Sick Slip) is used by the commander as a control for members of his unit. It is usually used to refer patients to a medical facility for medical attention. It is also used with routine requests for dental attention. No entries are needed in the LINE OF DUTY space and the signature of the dental officer is not required when LINE OF DUTY is "yes" and DISPOSITION is "to duty." The dental specialist should check DISPOSITION OF THE PATIENT and enter the time the patient was dismissed from the dental clinic. When a patient is placed on quarters, or when instructions are included in the REMARKS section, the dental officer's signature is needed.

Section IV. ANESTHETIC INSTRUMENTS

1-19. GENERAL

a. **Introduction.** Following the basic examination, the anesthetic is administered, when required. There are a few situations, such as an oral prophylaxis, in which an anesthetic is not necessary. However, in most restorative or surgical procedures, the dental officer will administer some type of anesthesia.

b. **Uses.** Anesthesia is the loss of sensation. It may be partial or complete. Certain drugs are used in dentistry to achieve anesthesia for the prevention of pain during surgical and restorative procedures. Local anesthesia, or anesthesia limited to small areas of the body, is used for most dental operations. General anesthesia, or insensibility of the entire body, is sometimes used for extensive oral surgery and cases in which local anesthesia is contraindicated. See paragraph 1-13 for systemic conditions requiring special precautions during anesthesia and surgery.

c. **Local Anesthesia.** Local surface (topical) anesthesia may be achieved by application of certain drugs to the skin or mucous membrane (see figure 1-14). Examples are Xylocaine® (lidocaine hydrochloride) and Benzocaine® (ethylamine benzoate). Another type of agent used for topical anesthesia is known as refrigerants (ethyl chloride). These are sometimes employed to relieve gagging tendencies during dental operations and to anesthetize the tissues over an abscessed area before incision for drainage. For local anesthesia of deeper tissues, such as the nerves of teeth, muscles, and alveolar bone, an anesthetic solution is injected into soft tissues.

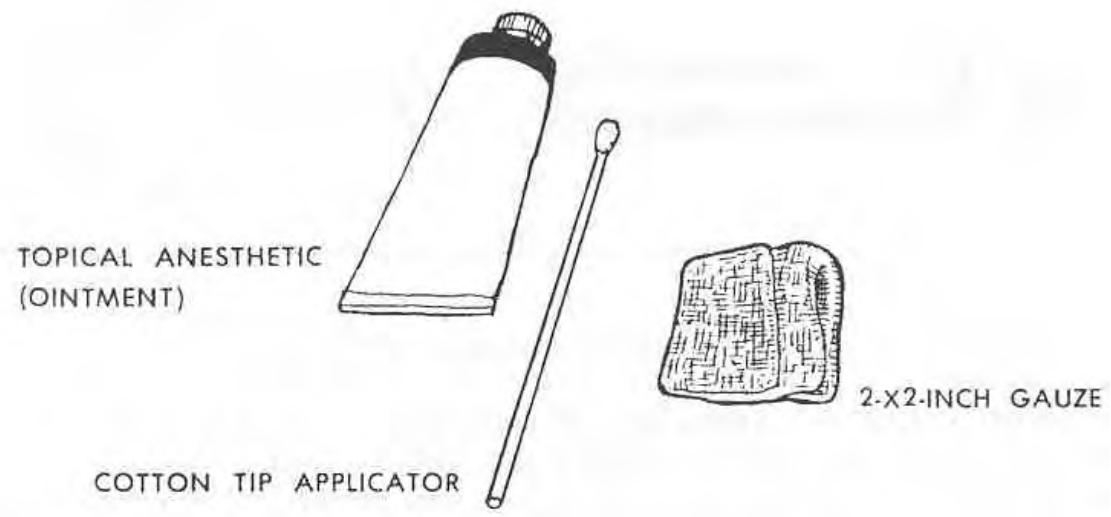


Figure 1-14. Materials for application of topical anesthetic.

1-20. INSTRUMENTS FOR LOCAL ANESTHESIA

a. **Anesthetic Syringe (SYRINGE, CARTRIDGE).** The anesthetic syringe (figure 1-15) is designed to support and expel anesthetic solution from a commercially prepared glass cartridge called a Carpule™. (The trademark name is Carpule.) The cartridge syringe available for local anesthesia has a thumb-ring handle at the outer end and a harpoon at the cartridge end of the plunger. The harpoon is designed to engage the rubber stopper plunger of the cartridge. The thumb-ring is used to draw back on the plunger to determine whether the needle has penetrated a blood vessel. This procedure is called "aspirating" and the syringe is an aspirating syringe.

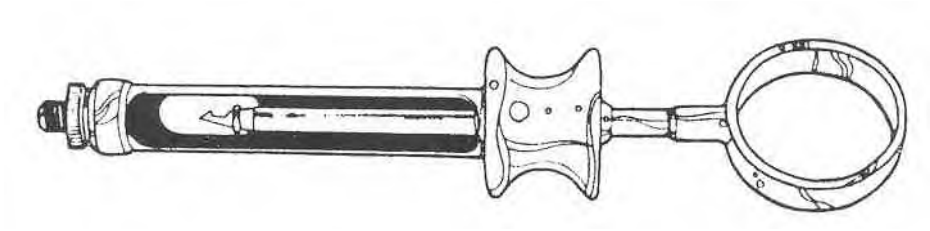


Figure 1-15. Anesthetic syringe (aspirating).

b. **Disposable Needles (NEEDLES, DISPOSABLE).** Disposable needles are packaged to keep them in a sterile condition. Once used, they are discarded. They are attached to the syringe by a plastic hub that is part of the disposable needle. They are supplied in lengths of thirteen-sixteenths of an inch and one and three-eighths of an inch. Disposable needles are always sterile, always sharp, and less likely to break than other needles. Hypodermic needles should be disposed of in such a way that they cannot injure clinic personnel and will not be available for pilferage or theft.

1-21. ANESTHETIC INSTRUMENT SETUP

a. **Sterilized Instruments.** As in the basic examination, the anesthesia also requires a certain setup. (Look in Annex A for typical instrument setups for various dental procedures.) One instrument in the setup that always requires autoclaving is the syringe. The other items are sterilized by the manufacturer and packaged in this condition.

b. **The Topical Anesthetic.** The first item in the setup is topical Xylocaine®. This anesthetic is produced in a jelly-like or ointment form. It is most often used to anesthetize the area where the actual injection is to be made. Two-inch-by-two-inch gauze or cotton tip applicators will be necessary when administering topical Xylocaine®. A small amount is placed on the applicator and applied over the area to be injected. The purpose of this topical anesthesia is to lessen the discomfort to the patient during the actual injection.

c. **The Syringe.** The syringe (side-loading cartridge syringe) is the only item in the setup that will require autoclaving after each patient. This syringe is used to administer local anesthetics. Syringe needles are the disposable type. The length and gauge needle used will vary depending on the preference of the dental officer. You will be handling two different needles: an infiltrative and a conductive needle. The infiltrative needle is 13/16 inch long and is used for maxillary injections. It is used to anesthetize a small area of possibly two or three teeth. The conductive needle is 1 3/8 inch long. Block injections are made with this, anesthetizing an entire area.

d. **Local Anesthetics.** Currently, two types of local anesthetics are available through routine supply: lidocaine hydrochloride (Xylocaine®) with epinephrine (1:50,000 to 1:100,000) and mepivacaine hydrochloride (Carbocaine®) without epinephrine. These types can be identified by their stopper color and by the color of their containers. For example: lidocaine hydrochloride with epinephrine, one part to fifty thousand, is recognized by a green stopper and green stripe on the container; lidocaine hydrochloride with epinephrine 1:100,000 has a red stopper and a red striped can; and mepivacaine hydrochloride has a white stopper and a brown container. The epinephrine is the controlling factor as to how long the anesthetic will last. The more epinephrine, the longer the area will stay anesthetized. The epinephrine is a vasoconstrictor that causes the tissue around the capillaries to swell and thus constricts the capillaries and slows the blood flow. The decreased blood flow slows diffusion of the anesthetic throughout the body, thus prolonging its action. It also aids in controlling bleeding.

e. **Aspiration Required.** The assembly and usage of the aspirating syringe is quite simple. The syringe is equipped with a device enabling the dental officer to determine if he is injecting into the blood stream. The accidental injection of the agent into the circulatory system may produce undesirable symptoms or death. Notice the thumb ring and the barbed plunger. The barb penetrates the rubber stopper of the anesthetic cartridge, permitting aspiration when the dental officer retracts the syringe plunger by means of the thumb ring.

f. **Instrument Setup.** For the instrument setup for local anesthesia, see figure 1-16.

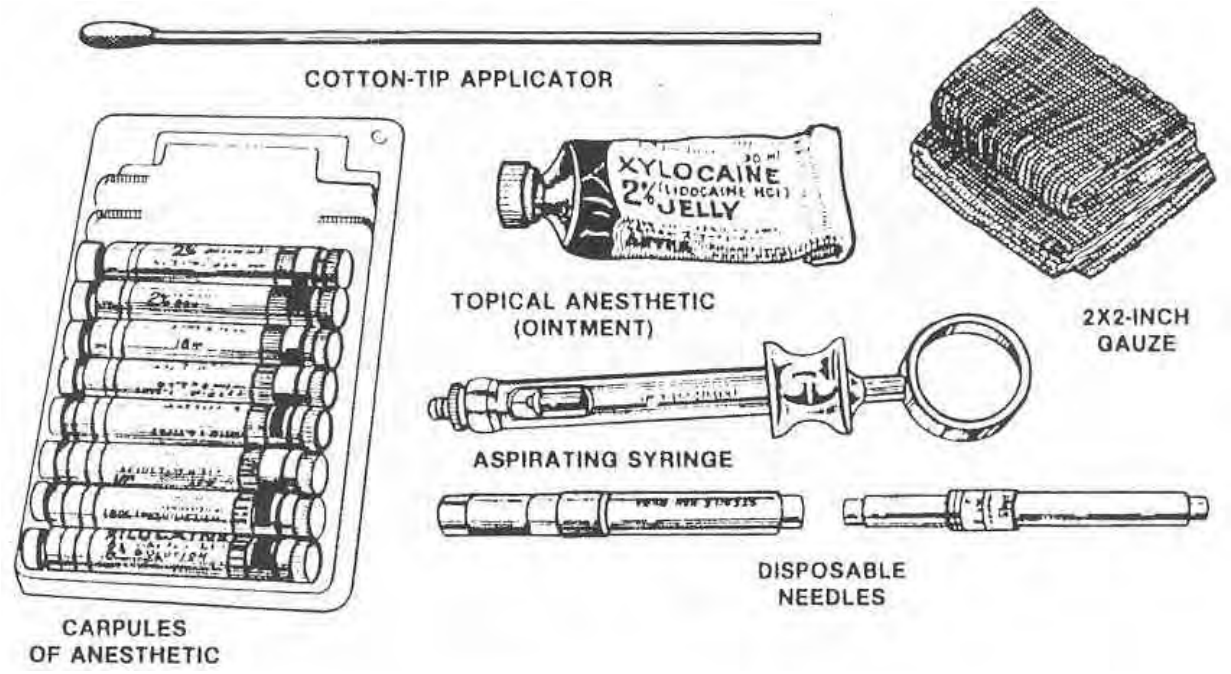


Figure 1-16. Instrument setup for anesthesia.

1-22. PROCEDURES

a. **Loading the Syringe.** When a disposable needle is used, the plastic hub is threaded on to the syringe without breaking the seal or removing the outer protective plastic cylinder. The first step is inserting the proper needle. The next step is to withdraw the plunger of the syringe and insert the Carpule™ (cartridge) of the anesthetic. After inserting the Carpule™, release the plunger and secure the barb in the rubber stopper by striking the thumb ring in the palm of the hand. The protective cylinder may be removed at the discretion of the dental officer. This usually will be done after the Carpule™ of anesthetic solution has been and inserted just before the injection is made. The needle and hub are discarded after use, following standard precautions, and in accordance with local policy.

b. **The Injection**.

(1) When the dental officer is ready to inject the anesthetic solution, he will dry the injection area with 2-inch-by-2-inch or 4-inch-by-4-inch gauze. He may then apply an antiseptic solution to the area with an applicator. The tissue is then ready for the injection. The specialist may hand each item to the dentist as needed and receive them from him as each step is accomplished. The dental specialist will be expected to assist by retracting tissues, reassuring the patient, and observing the patient for signs of fainting or any other reaction to the anesthetic.

(2) Local anesthetics are undoubtedly the most frequently used drugs employed in the practice of dentistry. The local anesthetic most commonly used in the Army is Xylocaine®, also called lidocaine hydrochloride (two per cent concentration with epinephrine 1:50,000 or 1:100,000). Packaging these anesthetics in disposable cartridges makes their use in the dental syringe quick and simple. Anesthetic needles come in different gauges and lengths. The long needle is used primarily for "block" type injections and the short needle for infiltration type injections; however, the long needle may be used for both types. The 25-gauge, long needle is the one provided in the dental field kit.

c. **Possible After Effects.** Although the techniques are followed, drugs are used which have a very high margin of safety, and equipment is used which is efficient and easily sterilized, complications do occur. The most common is syncope (fainting) caused by cerebral anemia (which is usually psychogenic in nature), normally lasting from 30 seconds to 2 minutes. If the patient does not injure himself (that is, by falling or by aspirating a foreign body and obstructing his airway), no problem of any consequence will arise. Syncope is treated by placing the unconscious patient in the shock position, using a cold, damp towel on his forehead, and/or allowing him to inhale the irritating fumes from an ammonia ampoule. Occasionally, allergic reactions to the drugs used may arise, but these are extremely rare.

Continue with Exercises

EXERCISES, LESSON 1

INSTRUCTIONS: The following exercises are to be answered by marking the lettered response that best answers the question or best completes the incomplete statement.

After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers.

1. The main purpose of four handed, sit-down dentistry is to:

   a. Give the dental assistant something to do.

   b. Enable the doctor-assistant team to handle more patients.

   c. Anticipate the dental officer's next move.

   d. Make the patient more comfortable.

2. A periodic dental examination:

   a. Can result in early diagnosis of localized diseases.

   b. Is limited to examination of dental tissue.

   c. Ignores systemic disease symptoms.

   d. Is not required for Army personnel.

SPECIAL INSTRUCTIONS: For exercise items 3 through 8, match the characteristics of instrument sharpening technique statement in column A with one of the three instrument sharpening techniques terms in column B. Write your responses in the spaces provided.

	COLUMN A		COLUMN B
____3.	It is useful for curved or irregularly-shaped nibs.	a.	Fixed-stone.
		b.	Mounted-stone.
____4.	It was invented by Dr. E. L. Kirkpatrick.	c.	Rotary-hone.
____5.	It removes the least amount of metal.		
____6.	It has the greatest control of the instrument.		
____7.	A Carborundum™ stone is used in this technique.		
____8.	A sandstone is used in this technique.		

9. Which of the principles below should NOT be followed in sharpening instruments?

   a. Use the plane of the surface being ground as a guide.

   b. Use lubrication.

   c. Reduce only the sharpened edge of the surface.

   d. Avoid excessive pressure.

   e. Sharpen instrument at first sign of dullness.

   f. Wear safety glasses.

10. In checking instrument sharpness:

    a. A shiny edge indicates the instrument is sharp.

    b. Hold the instrument at a 90º angle to the nail and push or pull lightly.

    c. A dull edge will appear as a black line.

    d. The thumbnail check is more reliable than the light test.

SPECIAL INSTRUCTIONS: For exercise items 11 through 18, match the characteristics of instruments used in the basic oral examination setup in column A with one of the six instruments used in the basic oral examination setup in column B. Write your responses in the spaces provided.

COLUMN A	COLUMN B
____11. They may be used to carry liquid medication.	a. Mouth mirrors.
____12. They are used for diagnostic purposes based on the sense of touch.	b. Explorers.
____13. They are also called dressing forceps.	c. Cotton pliers.
____14. The functional end can be replaced.	d. Saliva ejectors.
____15. They are attached to the dental unit.	e. Periodontal probes.
____16. They are used to determine the depth of soft tissue pockets.	f. Gauze pads.
____17. They are used to retract soft tissues of the cheeks, tongue, and lips.	
____18. The nib has marks which are graduated in millimeters.	

SPECIAL INSTRUCTIONS: For exercise items 19 through 25, match the characteristics of dental health classifications in column A with one of the four classifications of dental health in column B.

	COLUMN A		COLUMN B
____19.	Deep caries.	a.	Class 1.
____20.	Two annual exams missed.	b.	Class 2.
____21.	Routine, but not extensive, dental treatment required. Unlikely to result in a dental emergency within 12 months	c.	Class 3.
		d.	Class 4.
____22.	Pericoronitis.		
____23.	No dental treatment required.		
____24.	No dental records available.		
____25.	A fractured tooth.		

26. Which statement below does NOT reflect a reason why patient histories are taken and recorded?

    a. It helps the dental officer arrive at a diagnosis.

    b. It provides information on conditions, which might lead to complications during dental treatment.

    c. Taking the record helps establish rapport with the patient.

    d. It provides information that can be given to other government agencies upon request.

    e. Taking the record provides an opportunity for patient education.

27. It is important to know whether a patient has _____ so the dental officer and the patient's physician can take measures to control bleeding during surgical procedures.

    a. Angina pectoris.

    b. Hemophilia.

    c. Pernicious anemia.

    d. Hyperthyroidism.

28. High susceptibility to infections and periodontal disease are often associated with:

    a. Rheumatic heart disease.

    b. High blood pressure.

    c. Allergy and hypersensitivity.

    d. Pernicious anemia.

    e. Diabetes mellitus.

29. Radiographs:

    a. Are kept in the dental health record for six months.

    b. Are mounted and interpreted by the dental specialist.

    c. Reveal the presence of abscesses surrounding the roots of teeth.

    d. Are routinely given "wet readings" by the dental officer.

SPECIAL INSTRUCTIONS: For exercise items number 30 through number 35, match the characteristics of procedures for a basic oral examination in column A with one of the five selected procedures for a basic oral examination in column B. Write your responses in the spaces provided. Items in column B may be used more than once.

COLUMN A	COLUMN B
____30. The DA Form 3894, Dental Treatment Plan, is used.	a. Duties of the dental specialist.
____31. A means to request needed dental service in the absence of a dental appointment.	b. Request for consultation.
____32. Used with routine request for dental attention.	c. Study casts.
____33. Establishes routines to see patients in an orderly, smooth-flowing manner with minimum delay.	d. Dental sick call.
____34. Provides a duplication of the patient's mouth. Which is useful in consultations with other dental officers.	e. Individual Sick Slip
____35. The SF 513 is used and becomes a part of the patient's record.	

36. Lidocaine hydrochloride is the generic name for:

a. Epinephrine.

b. Carbocaine.

c. Benzocaine.

d. Xylocaine®

37. The infiltrative needle is used to anesthetize:

    a. An entire area.

    b. A small area.

    c. Tissues over an abscessed area.

38. The anesthetic syringe cartridge is made of:

    a. Glass.

    b. Plastic.

    c. Another substance.

39. The anesthetic syringe is sterilized by:

    a. The manufacturer.

    b. Autoclaving.

40. The most common negative after effect of dental anesthesia is:

    a. Allergic reactions.

    b. Obstruction of the airway.

    c. Falling.

    d. Aspiration of a foreign body.

    e. Fainting.

41. The MAIN duty of the dental specialist in the oral medicine and treatment service is:

a. Administration of the radiographic section.

b. Consultation with other professional services of the dental clinic.

c. Assuring that emergencies are seen first.

d. Relieving the dental officer of all but the strictly professional aspects of the routine work.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 1

1. b (para 1-1)
2. a (para 1-7)
3. b (para 1-5a(2))
4. c (para 1-5a(3))
5. a (para 1-5a(1))
6. c (para 1-5a(3))
7. a (para 1-5a(1))
8. b (para 1-5a(2))
9. c (para 1-5b)
10. d (para 1-5c)
11. c (para 1-9c)
12. b (para 1-9b)
13. c (para 1-9c)
14. a (para 1-9a)
15. d (para 1-9e)
16. e (para 1-9d)
17. a (para 1-9a)
18. e (para 1-9d)
19. c (para 1-12a)
20. d (para 1-12a)
21. b (para 1-12a)

22. c (para 1-12a)

23. a (para 1-12a)

24. d (para 1-12a)

25. c (para 1-12a)

26. d (para 1-13b)

27. b (para 1-13g)(6))

28. e (para 1-13g)(5))

29. c (para 1-14)

30. b (para 1-15a)

31. d (para 1-17)

32. e (para 1-18)

33. a (para 1-11)

34. c (para 1-16b(3))

35. b (para 1-15b)

36. d (para 1-19c)

37. b (para 1-21c)

38. a (para 1-20a)

39. b (para 1-21a)

40. e (para 1-22c)

41. d (para 1-11)

End of Lesson 1

LESSON ASSIGNMENT

LESSON 2 Restorative Instruments.

LESSON ASSIGNMENT Paragraphs 2-1 through 2-21.

LESSON OBJECTIVES After completing this lesson, you should be able to:

2-1. Define the meaning of the following terms:

a. Restorative.
b. Permanent restoration.
c. Interim.
d. Inlay.
e. Crown.
f. Fixed partial denture.
g. Pulp cap.
h. Cement base.
i. Rubber dam.

2-2. Name the classes of cavity preparations.

2-3. Identify the instruments used for examinations and diagnosis.

2-4. Identify the four identifying characteristics of burs and the uses of them in cavity preparation.

2-5. Name the uses of a rubber dam.

2-6. List the various types of stainless steel burs.

2-7. Cite the size and description of each of the following hand instruments.

a. Spoon excavators.
b. Enamel chisel.
c. Enamel hatchets.
d. Gingival Margin Trimmers.

2-8. Describe the uses of matrix retainers and bands.

2-9. Describe the uses of the following:

a. Spatula.
b. Cement pluggers.
c. Amalgamator.
d. Amalgam pluggers.
e. Carvers.
f. Hand finishing instruments.
g. Motor driven finishing instruments.

2-10. State the ways the dental specialist can assist the dental officer during cavity preparation.

2-11. Identify the procedures for placing a rubber dam.

2-12. Identify the procedure for cavity preparation.

2-13. Identify the procedures for restorations with cement-based amalgams.

2-14. Identify the procedures for placing a metal matrix band.

2-15. Identify the procedures for restorations with composite resin.

2-16. Identify the procedures for gold alloy inlays (crowns).

SUGGESTION

After studying the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 2

RESTORATIVE INSTRUMENTS

Section I. INTRODUCTION

2-1. GENERAL

The Restorative Section is the element of a dental service in which decayed or fractured teeth are rebuilt or repaired by artificial materials in the form of amalgam restorations, composite resins, or crowns. In some clinics, the Restorative Section is divided into two services: operative, where restorations are placed, and fixed, where crowns and fixed partial dentures are fabricated, fitted, and cemented into place. Endodontic treatment, the treatment of dental pulps and the filling of root canals, is sometimes performed in the Restorative Section. See Lesson 4 for discussion of the dental specialist in endodontics.

2-2. DEFINITIONS

a. **Restorations.** Restorations are artificial replacements for missing portions of teeth. They are retained in place within the confines of tooth structures prepared to receive them. The ideal restoration is one which restores the function and normal contours of the tooth; restores normal contact with adjacent teeth; protects the pulp, remaining tooth structure, and any adjacent periodontal tissues; withstands forces tending to fracture, wear, erode, or dislodge it; and presents an esthetic appearance.

b. **Permanent Restoration.** A permanent restoration is one that is intended to last for a prolonged period. It is made of a type of restorative material having properties that make it relatively durable and resistant to mechanical forces and chemical activity found in the mouth. Commonly used permanent restorative materials are silver amalgam, gold alloys (for inlays and crowns), and composite resin.

c. **Interim (Temporary) Restoration.** An interim, or temporary, restoration is one which is intended to protect a tooth between dental appointments or until more definitive and lasting treatment can be performed. Materials that may be used for interim restorations include various dental cements and soft metallic or celluloid preformed crowns temporarily cemented into place. Common interim restorative materials are zinc oxide and eugenol, also intermediate restorative material (IRM).

d. **Inlay.** An inlay is a restoration, usually made of gold alloy, which is cemented into place in a prepared area in a tooth. Steps in the fabrication of an inlay begin with the making of a wax pattern of the prepared area. The wax pattern is used to form a mold into which melted gold alloy is cast. The wax pattern is thus duplicated in gold to fit the prepared area.

e. **Crown.** An artificial crown is a replacement for enamel and other layers of the natural crown of a tooth. Crowns are commonly made of metal alloys, acrylic resin, or porcelain. They are classified according to the type of material used in their construction and the number of tooth surfaces which they cover. For example, a three-quarter crown gold alloy is a crown made of gold alloy replacing three of the axial surfaces of the natural tooth crown. A full porcelain crown (or porcelain jacket) is one made of porcelain replacing all the surfaces of the crown of a tooth. A veneer crown is a full metallic crown with a porcelain or acrylic resin veneer on the facial surface. Steps in the fabrication of the various crowns are generally the same as those for the inlay.

f. **Fixed Partial Denture.** A fixed partial denture, often called a bridge or a fixed bridge, is a prosthodontic restoration which is fabricated to replace a missing tooth or teeth and is held in place by crowns or inlays cemented to one or more adjacent natural teeth.

g. **Pulp Cap.** Pulp capping is a treatment procedure in which a material is placed over an exposed or near-exposed portion of a dental pulp to protect it and facilitate its recovery from the effects of chemical, mechanical, or bacterial irritation. Calcium hydroxide is the preferred base material in pulp capping.

h. **Cement Base.** A cement base is a foundation that is made of either zinc phosphate cement or zinc oxide and eugenol cement. The cement base is placed in the deep portions of cavities to protect the pulp from chemical, thermal, or electrical trauma.

i. **Rubber Dam.** A rubber dam is thin, rubber sheet material used to isolate the teeth and keep them dry during the performance of certain restorative and endodontic procedures.

2-3. CLASSES OF CAVITY PREPARATIONS

Cavity preparation is the term used to describe the process of preparing a tooth to receive a restoration. It includes the removal of decayed material, the necessary cutting and shaping of remaining tooth structure, and the cleaning of the prepared area. Certain basic principles of cavity preparation, first advanced by the American dentist, Dr. G. V. Black in the early part of the twentieth century, still serve as standards. These principles provide for convenience in placing the restoration, retention of the restoration, sufficient bulk and strength of restoration and remaining tooth structure, and prevention of further dental caries. The design of the cavity preparation must take into account the location and size of the cavity, the stresses to which it will be subjected, and the type of restorative material to be used. Cavity forms are classified according to the tooth surfaces involved.

a. Class I cavity preparations (pits and fissures) are one-surface preparations which involve the occlusal surfaces or the occlusal two-thirds of the facial or lingual surfaces of a posterior tooth or the lingual pits of maxillary anteriors.

b. Class II cavity preparations are those that involve the proximal surfaces of posterior teeth.

c. Class III cavity preparations are one-surface preparations that involve the proximal surfaces of anterior teeth.

d. Class IV cavity preparations are those that involve the proximal surfaces and the incisal angle of anterior teeth.

e. Class V cavity preparations are one-surface preparations that involve the gingival third of the labial, buccal, or lingual surfaces of any teeth.

f. Class VI cavity preparations are those that involve areas not normally affected by dental caries such as the incisal edges of anterior teeth and the cuspal tips of posterior teeth. This class is in addition to Dr. G. V. Black's original five classes.

2-4. FACILITATING PATIENT TREATMENT

In the age of four-handed, sit-down dentistry, a well-trained assistant is an integral part of a restorative procedure. Part of your responsibility will be to anticipate the dental officer's next move and have the instruments ready when he needs them. To do this efficiently, you must have a thorough working knowledge of a variety of restorative instruments. Your knowledge, combined with practice, will add to the efficiency of the dental officer and the comfort of the patient by helping treat the patient much more quickly.

Section II. INSTRUMENTS

2-5. EXAMINATION AND DIAGNOSTIC INSTRUMENTS

The examination and diagnostic instruments described in Lesson 1 are used in all treatment areas of the dental service. Mouth mirrors, explorers, cotton pliers, disposable saliva ejector, periodontal probe, gauze pads, and cotton rolls or cotton dispensers are the first instruments set out before any dental procedure is begun.

2-6. LOCAL ANESTHETIC INSTRUMENTS

Local anesthesia is used extensively in restorative dentistry to reduce the pain associated with these procedures. The instruments and techniques used in administering a local anesthetic and the duties performed by a dental specialist during this procedure are described in Lesson 1.

2-7. RUBBER DAM (RUBBER DAM)

Moisture presents a problem in the performance of many dental operations. Dryness of the operative field is essential to the success of restorations and endodontic procedures. The use of the rubber dam is the best method of maintaining a dry field. Rubber dam equipment is listed and illustrated in figure 2-1. See paragraph 2-15 for procedure on how to place a rubber dam in a patient's mouth.

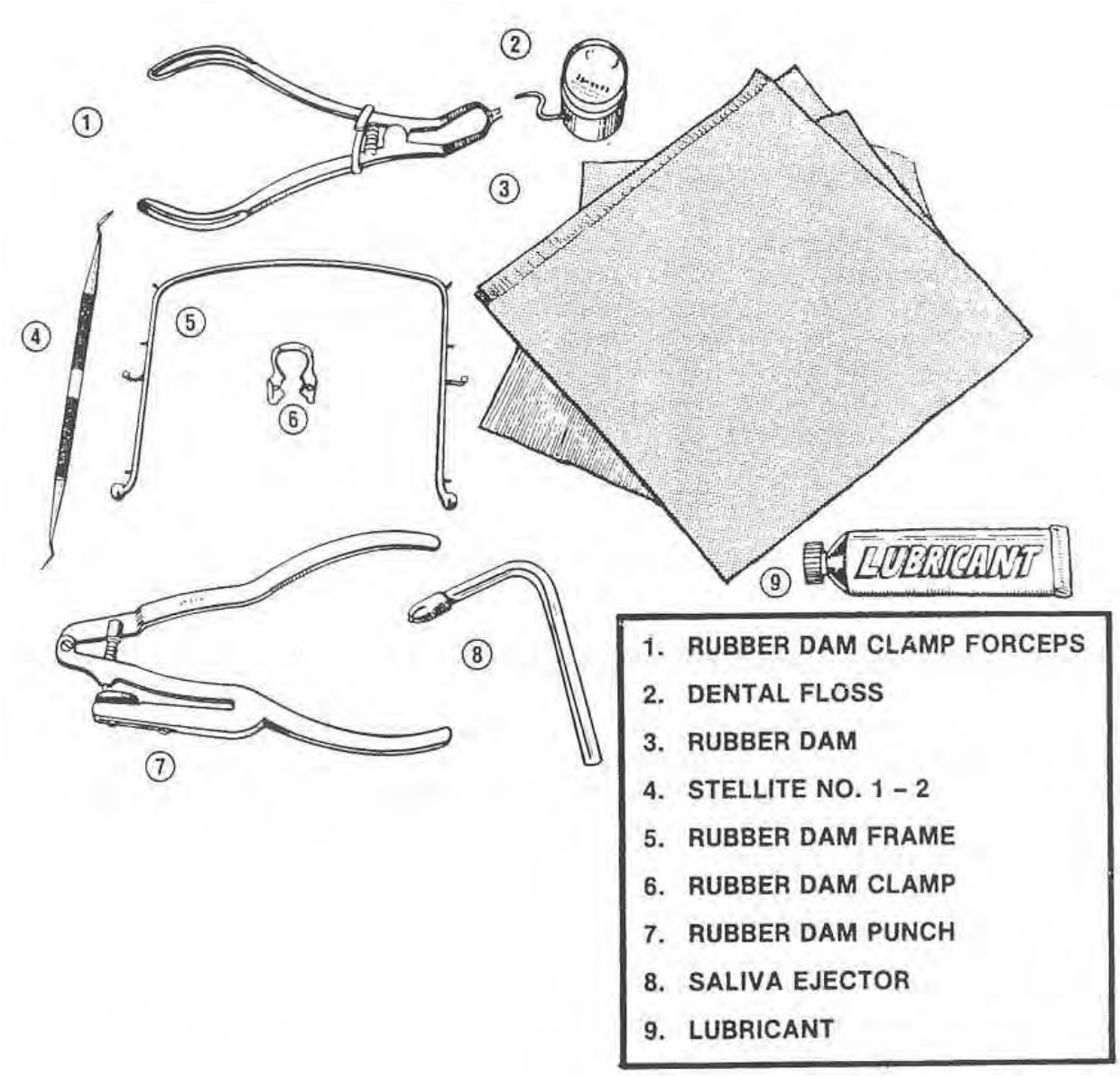


Figure 2-1. Rubber dam equipment.

2-8. SALIVA EJECTORS (MOUTHPIECE, SALIVA EJECTOR, DENTAL)

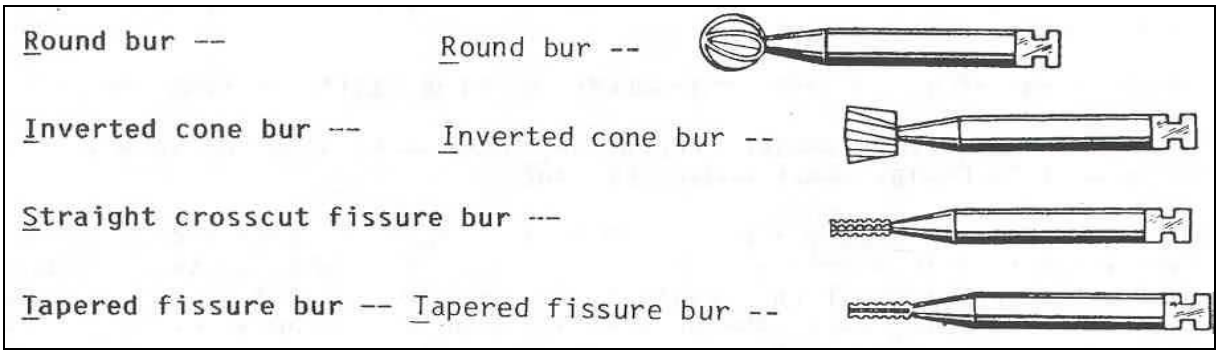
Saliva ejector mouthpieces are made to attach at one end to the saliva ejector tubing on the dental unit. The other end rests in the mouth for the evacuation of saliva, blood, water, or debris during dental procedures.

2-9. MOTOR DRIVEN ROTARY INSTRUMENTS USED FOR CAVITY PREPARATION

a. Burs (BUR, DENTAL EXCAVATING, SLOW-SPEED STRAIGHT HANDPIECE OR SLOW-SPEED CONTRA-ANGLE HANDPIECE)

(1) Characteristics. In discussing the preparation of a cavity for restoration in a modern clinic, it is essential that we talk about the many different kinds of burs available to the dental officer. Regardless of the procedure being done, the burs will probably be used in preparing the cavity for restoration. They are manufactured in different sizes and shapes suited to the various types and forms of the cavity preparation desired. You will be expected to know four different things about the burs that you are given: The shape (name) of the working end, the series number of the bur, the material of which it is made, and in which hand piece each type of bur may be used. Series numbers and bur shapes are associated with each other: A round bur is in the ten series, an inverted cone bur is in the thirty series, a straight crosscut fissure bur is in the five hundred series, and the tapered fissure bur is in the seven hundred series. Burs may be made of one of two materials: A stainless steel bur will have a smooth shank, and a tungsten carbide alloy, bur will have a ring, a set of parallel rings, or possibly a ring of X's around the shank. Tungsten carbide burs will stay sharp longer than stainless steel burs, and they may be used repeatedly without marked reduction in cutting efficiency. There are three different hand piece attachments for the burs. The slow-speed straight hand piece (SHP) uses a friction grip attachment and accepts a bur with a long shank. This means that the end of the bur that goes into the hand piece is smooth and is held in the hand piece by friction. The shank of the straight hand piece bur is not only longer but also larger than the other burs. The bur that goes into the slow-speed contra-angle hand piece (AHP) is almost as large around as the straight handpiece bur, but it is much shorter and has a notched end with a groove opposite the working end that fits into the latch attachment on the angle handpiece. The bur for all high-speed hand pieces (HSHP) is smaller and shorter than the other burs; it also has a friction grip attachment (that is, the end is smooth). The Midwest Quiet-Air hand piece accepts the friction grip bur, but the hand piece is designed with a chuck that must be tightened on the bur. Burs are an essential part of the setup for the dental officer performing a restorative procedure. They are the rotary cutting instruments that replace many of the hand instruments used in a cavity preparation procedure. You will be required to know four identifying characteristics about dental burs.

(a) The first type is a description of the shape of the working end as illustrated in figure 2-2.



NOTE: The first letter of each bur type is underlined. These four letters, in order, spell "RIST." This key word will help you learn the burs in increasing numerical sequence.

Figure 2-2. Bur shapes.

(b) The second identifier is the number:

1 10 series--(Round bur)

2 30 series--(Inverted cone bur)

3 500 series--(Straight crosscut fissure bur)

4 700 series--(Tapered fissure bur)

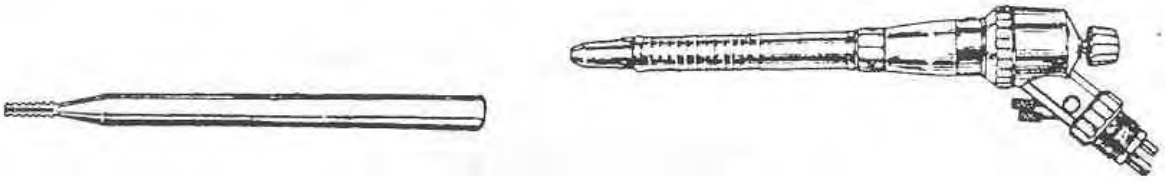
(c) The third is composition.

(d) The fourth is the hand piece attachment. Burs are attached to one of three hand pieces. To establish which hand piece a bur is used in, you may look at the end away from the working end, as illustrated in figure 2-3.

(e) Any of the independent factors describing burs may be combined when designing a bur. Obviously, the use and series numbers correspond with the name or shape of the bur. However, any shape bur may be made of either of the two materials and it may be made to fit into any of the three types of hand pieces.

Contra-angle handpiece (AHP): Burs used in this handpiece will have a notched end with a groove for the latch attachment.

Straight handpiece (SHP): Burs used in this handpiece will have a very long, smooth shank.



High speed handpiece (HSHP): Burs used in this handpiece will have a smooth shank like that of the straight handpiece, but the shank will be smaller and much shorter. These are known as "friction grip" burs.

The Midwest Quiet-Air handpiece uses the same "friction grip" burs, but it is designed with a chuck that must be tightened on the bur.

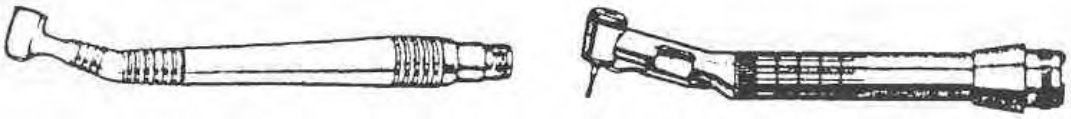


Figure 2-3. Bur hand pieces.

(2) Availability. Available stainless steel burs include the following for both AHP and SHP except as noted: round burs numbers 1/2, 2, 4, 6, and 8; inverted cone burs numbers 33 1/2, 35, 37, and 39 (39 is available for AHP only); straight crosscut fissure burs numbers 557, 558, 559, and 560 (560 is available for AHP only); and tapered crosscut fissure burs numbers 700, 701, 702. Angle hand piece steel burs numbers 4, 35, and 558 are available in either the standard or short-neck lengths. Tungsten carbide burs are available for the AHP in the same sizes except for numbers 1/2 and 560. An end-cutting tungsten carbide bur is available as number 901. The tungsten carbide burs function best at high-speed operations; they are harder than stainless steel burs. Available friction grip tungsten carbide burs (see figure 2-4) include the following for high-speed angle hand pieces: round burs. Numbers 1/2, 2, 4, and 6; inverted cone burs numbers 33 1/2, 34, and 35; straight, crosscut fissure burs number 557 and 558; straight, plain fissure bur number 57; tapered, crosscut fissure burs number 699, 700, and 701; and tapered, plain fissure bur number 170L.

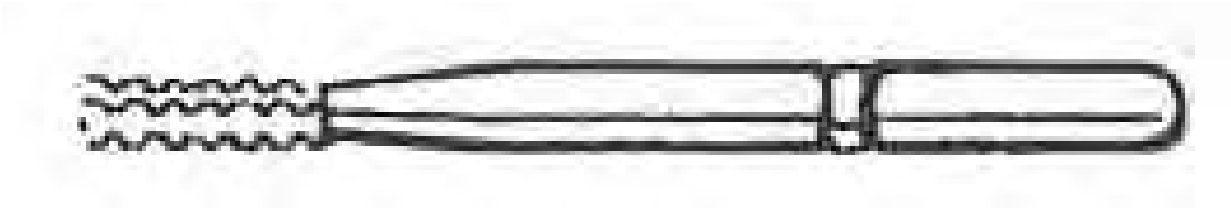


Figure 2-4. Friction-grip tungsten carbide bur.

b. **Diamond Stones and Wheels (WHEEL, ABRASIVE, MANDREL, MOUNTED, DIAMOND, ANGLE HAND PIECE or SLOW-SPEED STRAIGHT HAND PIECE).** Diamond stones and wheels (figure 2-5) are used to cut enamel and are manufactured in various sizes and shapes. These instruments create heat during use and require water or air-cooling if used for any length of time.

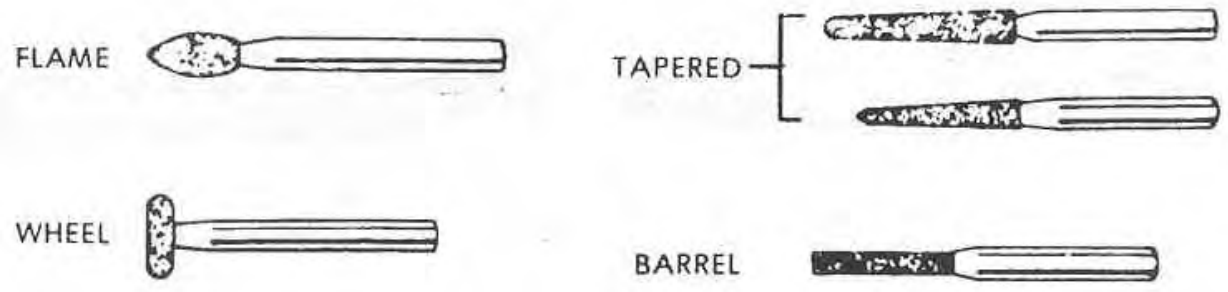


Figure 2-5. Diamond points.

2-10. HAND INSTRUMENTS USED FOR CAVITY PREPARATION

a. **General.** Hand instruments are used extensively in cavity preparation. A number of instruments of different designs are used for performing different tooth cutting and caries-removing procedures on various surfaces of different teeth and in different parts of the mouth.

b. **Spoon Excavators (EXCAVATOR, DENTAL).** Spoon excavators (figure 2-6) are used in removing debris and decayed dentin from cavities. Paired instruments are used. These include Darby-Perry instruments numbers 5, 6, 21, and 22, and black instruments numbers 63, 64, 65, and 66.

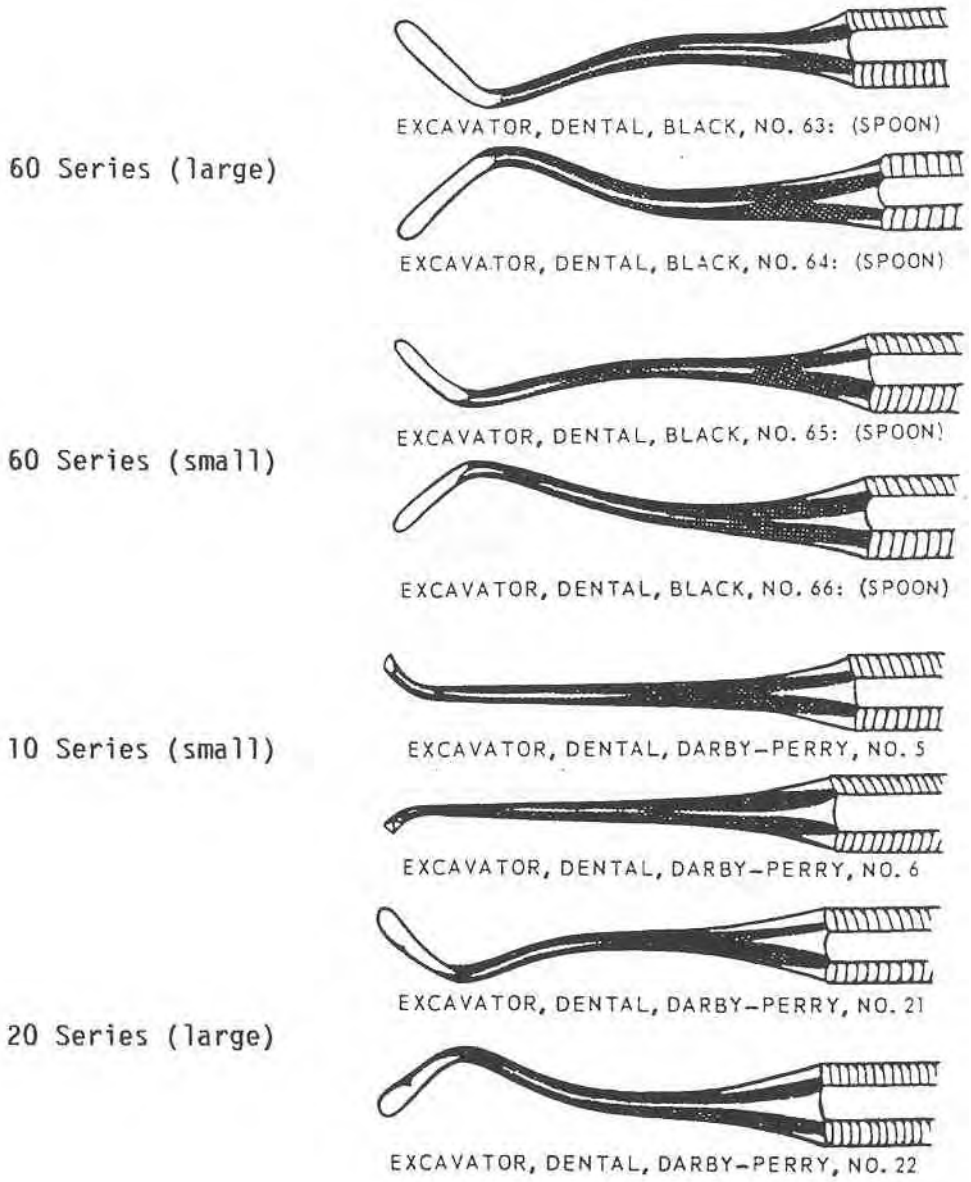

60 Series (large)
EXCAVATOR, DENTAL, BLACK, NO. 63: (SPOON)
EXCAVATOR, DENTAL, BLACK, NO. 64: (SPOON)
60 Series (small)
EXCAVATOR, DENTAL, BLACK, NO. 65: (SPOON)
EXCAVATOR, DENTAL, BLACK, NO. 66: (SPOON)
10 Series (small)
EXCAVATOR, DENTAL, DARBY-PERRY, NO. 5
EXCAVATOR, DENTAL, DARBY-PERRY, NO. 6
20 Series (large)
EXCAVATOR, DENTAL, DARBY-PERRY, NO. 21
EXCAVATOR, DENTAL, DARBY-PERRY, NO. 22

Figure 2-6. Spoon excavators.

c. **Enamel Chisels (CHISEL, DENTAL)**. Chisels (figure 2-7) are hand instruments used in cavity preparation. They are designed to cleave enamel along the lines of the enamel rods and to prepare the walls and accessible margins of a cavity. Straight chisels have single bevels and straight shanks. Bin-angle chisels have single bevels and two bends in their shanks. Wedelstaedt chisels have single bevels and curved shanks. Enamel chisels include Wedelstaedt numbers 41 and 42, and black numbers 81, 83, 84, 85 and 86.

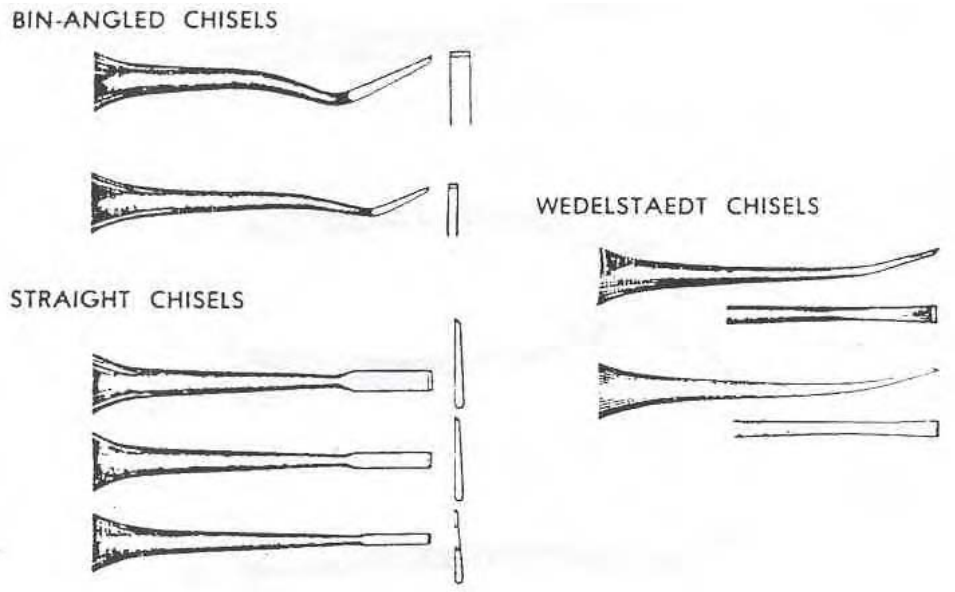


Figure 2-7. Chisels.

d. **Enamel Hatchets (EXCAVATOR, DENTAL)**. Hatchets (figure 2-8) are instruments designed to cleave enamel along the lines of enamel rods and to prepare the walls and accessible margins of a cavity preparation. They include black numbers 8, 17, 23, 51, 52, 53, and 54.

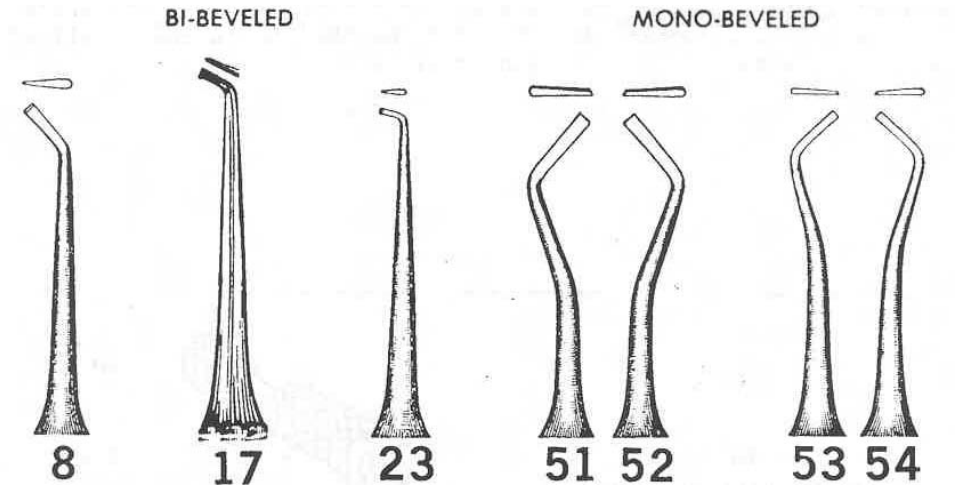


Figure 2-8. Hatchets.

e. **Gingival Margin Trimmers (TRIMMER, GINGIVAL MARGIN)**. Gingival margin trimmers (figure 2-9) are used to bevel the enamel at the cervical seat of the cavity preparation. They include black numbers 77, 78, 79, and 80.

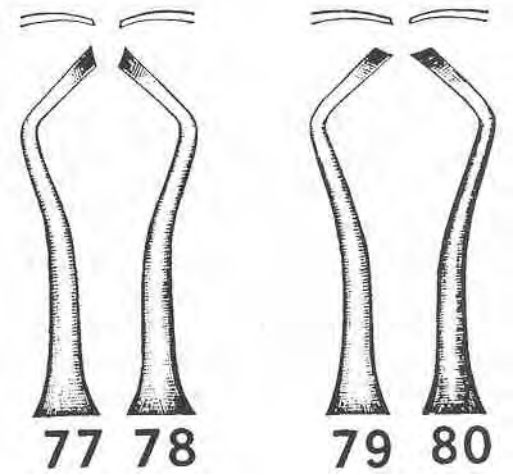


Figure 2-9. Gingival margin trimmers.

2-11. MATRIX RETAINERS AND BANDS

A matrix confines the restorative material in the cavity preparation. It also establishes proper contours in restorations replacing missing walls of the tooth.

a. **Matrix Retainers (RETAINER, MATRIX, DENTAL)**. Matrix retainers (figure 2-10) are used to hold and adjust matrix bands on the teeth. These include Ivory retainers numbers 1 and 9 and the contra-angle Tofflemire retainer that comes in adult and junior sizes.

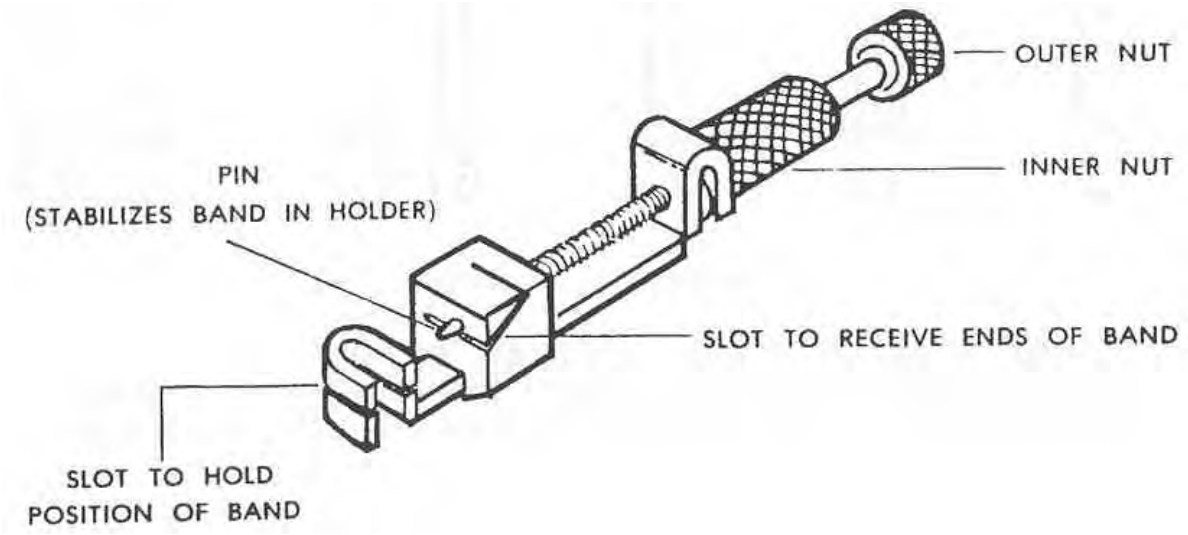


Figure 2-10. Tofflemire matrix retainer.

b. **Matrix Bands and Band Material (BAND, MATRIX, DENTAL; BAND SET, MATRIX, DENTAL; BAND, COPPER, DENTAL; PLASTIC STRIP, DENTAL MATRIX).** Matrix bands (figures 2-11, 2-12, and 2-13) are used to form missing walls of prepared teeth. They shape and confine restorative materials and wax to areas prepared to receive restorations. These include Ivory matrix band sets, Tofflemire matrix band sets, a cervical set, plastic celluloid strips, and metal matrix strips. Related materials include a celluloid matrix wedge and a crown form set. Celluloid crown forms are designed for specific teeth and are used as matrices for Class IV restorations.

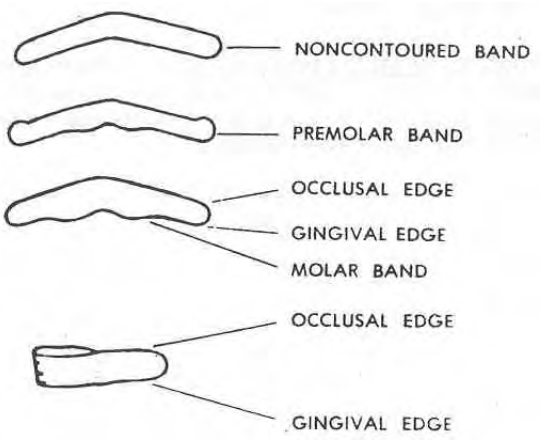


Figure 2-11. Matrix bands.

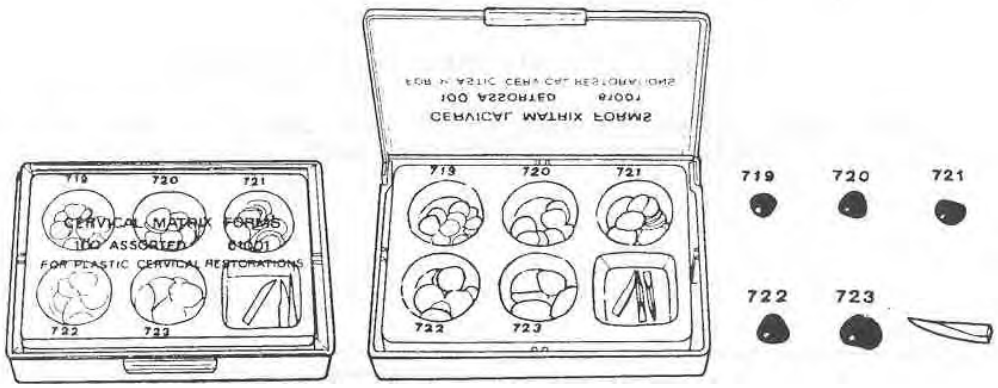


Figure 2-12. Cervical matrix retainers.

Figure 2-13. Celluloid crown forms.

2-12. INSTRUMENTS USED IN FILLING PREPARED CAVITIES

a. **Spatula (SPATULA, DENTAL).**

(1) Cement spatulas (figure 2-14). Cement spatula Number 324 is used to mix and handle cements. Stainless steel spatulas are used to mix various dental cements and IRM, but not with silicate cements. The plastic spatula should be used for silicate cements.

Figure 2-14. Stainless steel spatula.

(2) Wax spatulas (figure 2-15). Wax spatulas, Beale Number 7 and Gritman Number 31, when heated, are used for the manipulation of wax.

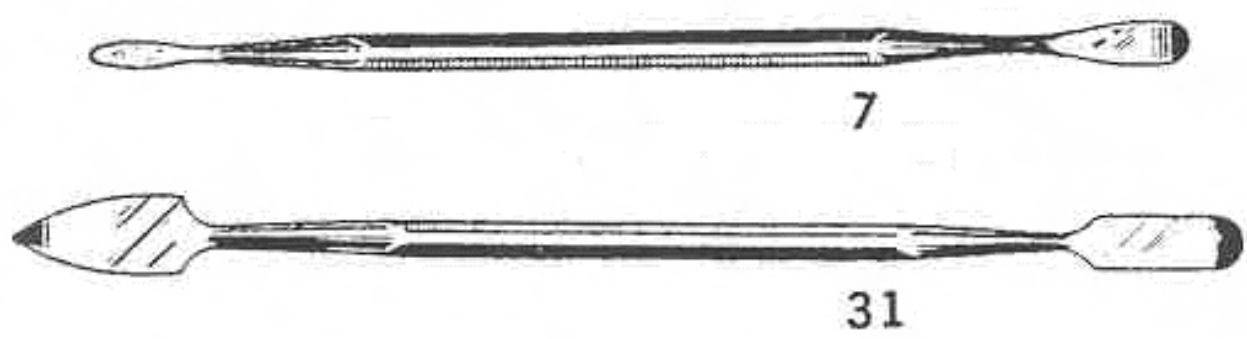


Figure 2-15. Wax spatulas.

b. **Cement Placing and Plugging Instruments (PLUGGER, PLASTIC FILLING, DENTAL)**. These placing and plugging instruments (figure 2-16) are used to carry and pack cement into place in the prepared cavity. Stainless steel pluggers, such as Gregg Numbers 2 and 3 and Ladmore and Woodson Numbers. 1, 2, and 3 are used with any cement except silicate cement. The chrome-cobalt stellite instruments numbers 1-2 and numbers 5-7 are used with various dental cements, including silicate cement. The instrument used will depend on the dental officer's preference.

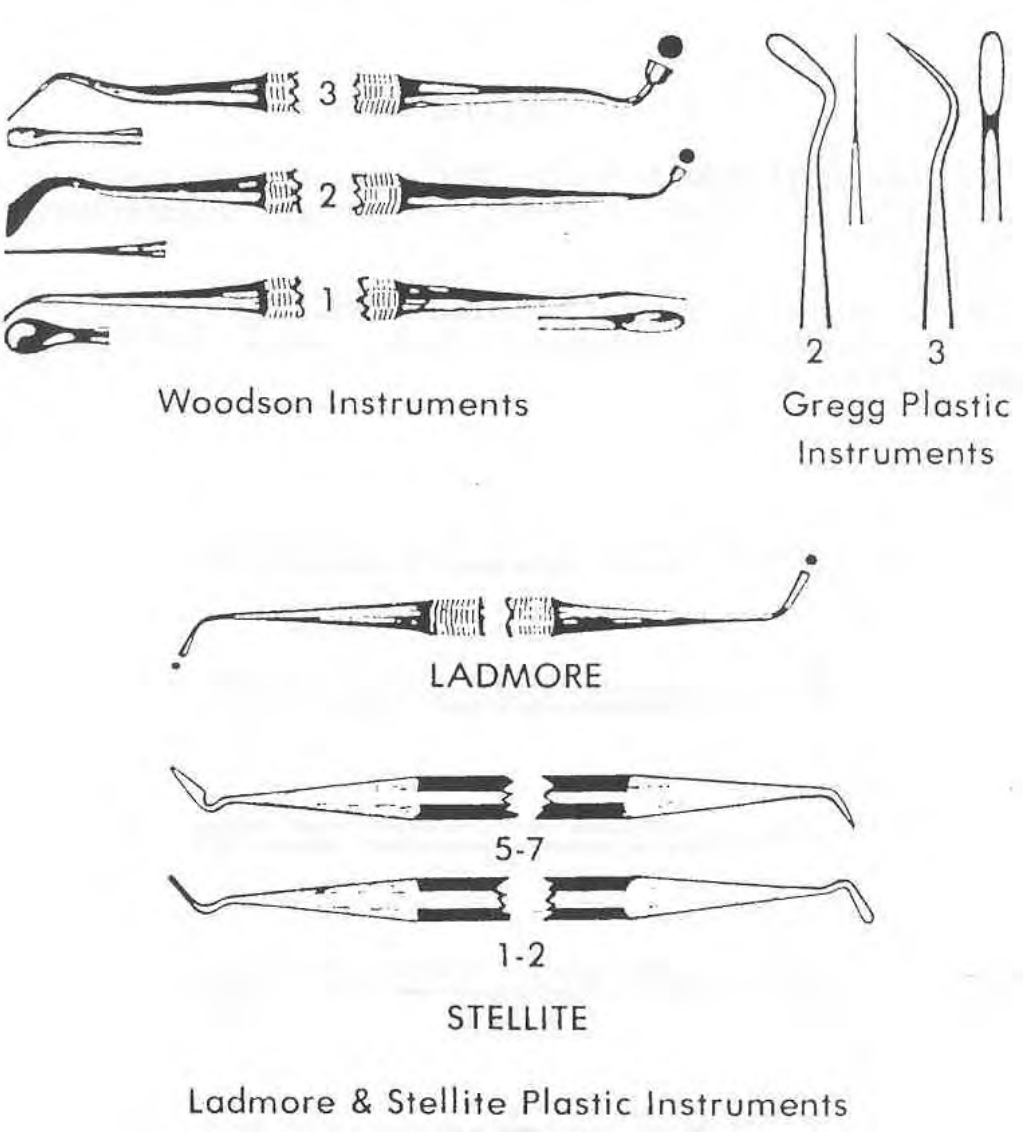


Figure 2-16. Placing and plugging instruments.

c. **Dycal Instrument.** This instrument is supplied by the manufacturer with the Dycal kit. It is used to place the Dycal base material.

d. **Amalgam Carrier (CARRIER, AMALGAM)**. Amalgam carriers (figure 2-17) are used to carry silver amalgam into place in the prepared cavities. The standard item of issue for the Army is the Ivory type.

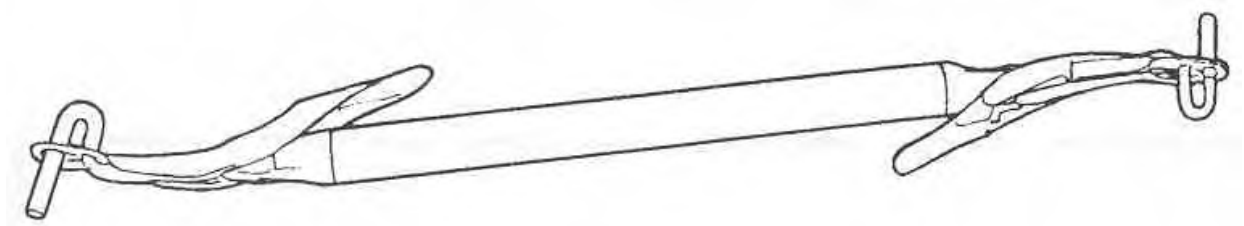


Figure 2-17. Amalgam carrier.

e. **Amalgamator (AMALGAMATOR, ELECTRIC, DENTAL).** Amalgamators are used to mix silver alloy and mercury for silver amalgam restorations. They are activated by electric motors.

f. **Amalgam Pluggers (PLUGGER, AMALGAM, DENTAL)**. Amalgam pluggers (figure 2-18) are used to condense amalgam in a cavity preparation. These include black pluggers 1 through 5.

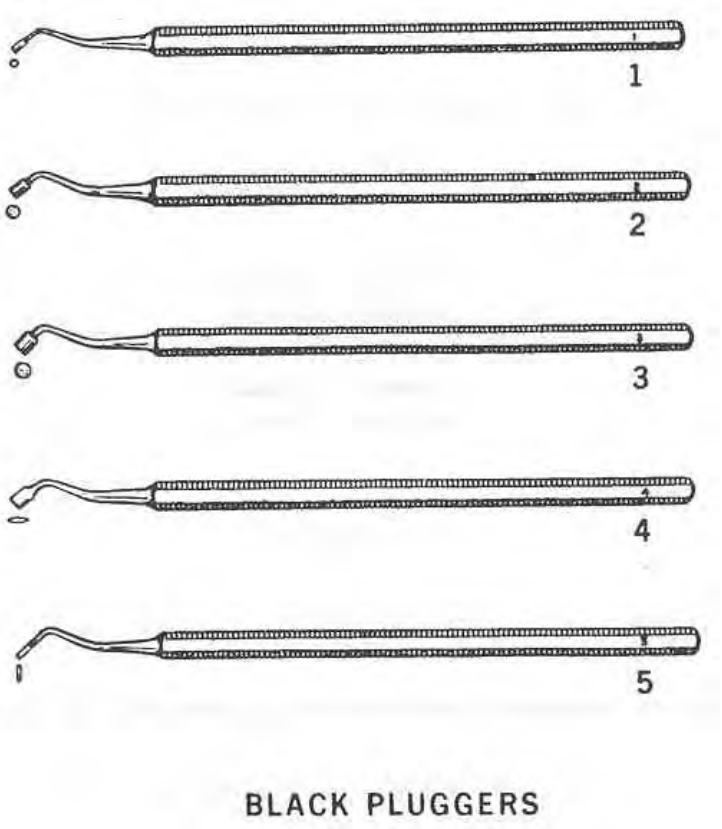


Figure 2-18. Amalgam pluggers.

2-13. CARVING AND FINISHING INSTRUMENTS

a. **Carvers.**

(1) Amalgam carvers (CARVERS, DENTAL AMALGAM). Amalgam carvers are used to carve anatomy into partially set amalgam restorations. This includes the "H" or No. 14 carver (figure 2-19).

Figure 2-19. "H" carver.

(2) Amalgam and wax carver (CARVER, DENTAL, AMALGAM AND WAX). These include Hollenback carvers 1, 2, and 3 (figure 2-20). They are suitable for carving both amalgam and wax.

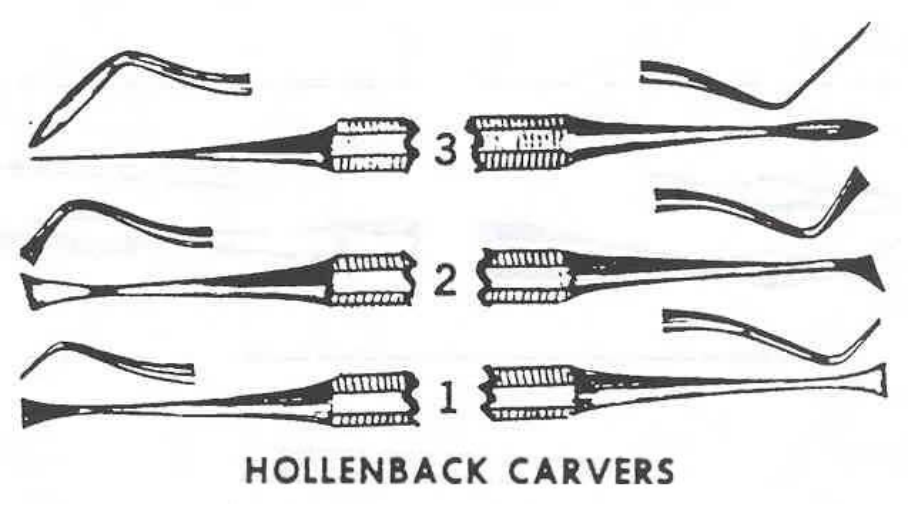


Figure 2-20. Amalgam and wax carvers.

(3) Miscellaneous carvers (EXCAVATOR, DENTAL) (figure 2-21). Discoid and cleoid carvers are adaptable to several uses, including excavation of carious dentin and carving of amalgam or wax. They are named Black excavators 89 and 92. The cleoid and discoid carvers are often found as a double-ended instrument. An example is the Tanner number 5.

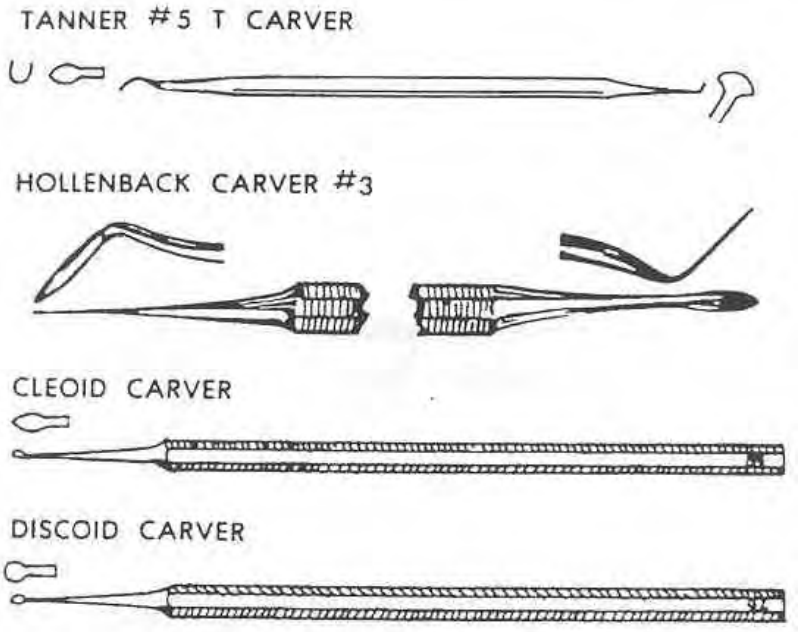


Figure 2-21. Discoid and cleoid carvers.

(4) Wax carvers (CARVER, DENTAL). Only one instrument, the Roach carver (figure 2-22), is listed as a wax carver.

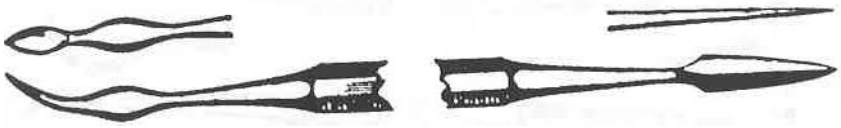


Figure 2-22. Wax carver.

b. **Hand Finishing Instruments.**

(1) Burnishers (BURNISHER, DENTAL). Burnishers (figure 2-23) are used to polish, work-harden, or burnish gold or other metals and materials. Burnishing is the process of moving or drawing a surface of metal to a greater depth. If a round steel point is rubbed over a margin of a gold alloy inlay, the metal may be moved so that any small discrepancy between the restoration and the tooth is closed. This action will finish (even) the margins of restorations.

(2) Knives. Knives may be used to finish the margins of restorations. Black number 8 is in common use.

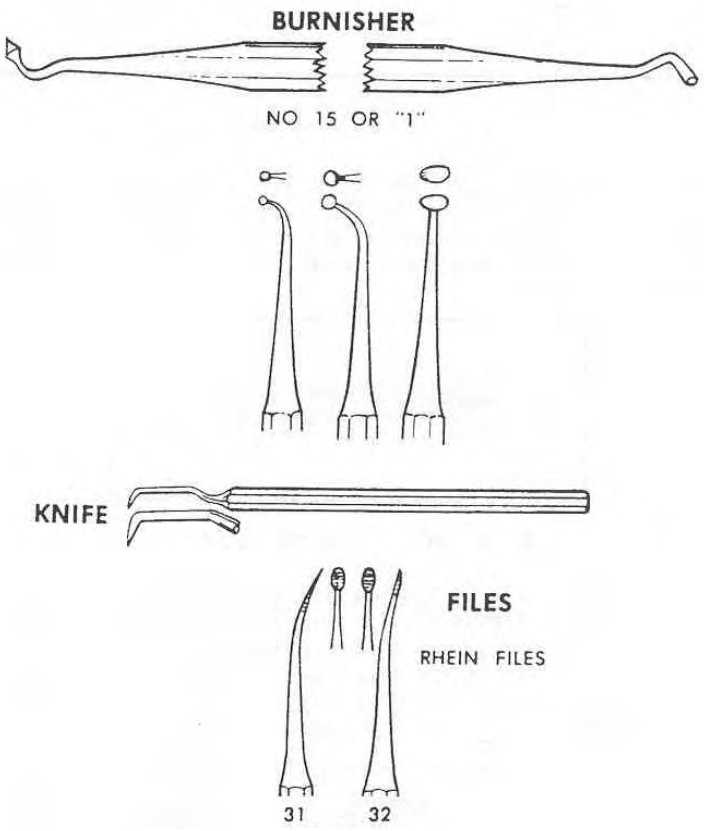


Figure 2-23. Hand finishing instruments.

c. **Motor-Driven Rotary Finishing Instruments.**

(1) Finishing burs (BUR, DENTAL, FINISHING, AHP or SHP). Finishing burs (figure 2-24) are used to even the margins and polish the surface of dental restorations. They are available in round, oval, bud, sugarloaf, and tapered fissure shapes. Round and bud shapes are available for both AHP and SHP; the remaining shapes for AHP only.

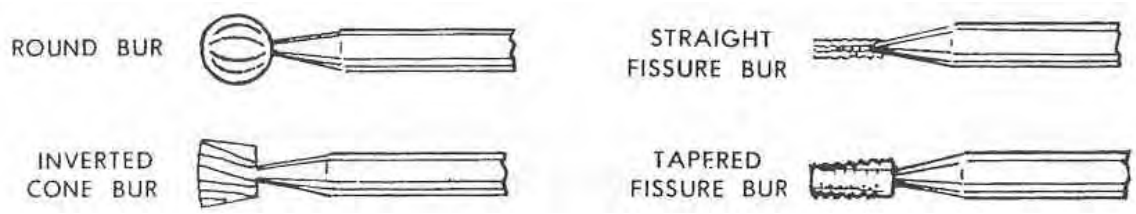


Figure 2-24. Finishing burs.

(2) Mandrels (MANDREL, DENTAL HANDPIECE). Mandrels are used to hold disks and wheels during their use. Snap-head mandrels (figure 2-25) are used only for sandpaper and linen-backed disks with a special brass center which snaps on to the mandrel. Screw-type mandrels are used to mount abrasive disks and unmounted stones.

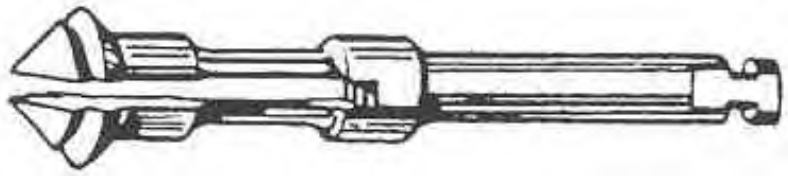


Figure 2-25. Snap-head mandrel.

(3) Abrasive and polishing disks (DISK ABRASIVE). Disks of various diameters and surfaced with various abrasives upon different types of backings are used for purposes ranging from rapid cutting of enamel to fine polishing of restorations (see figure 2-26). They include sandpaper disks (abrasive on one side), double-cutting disks (abrasive on both sides), and diamond disks. Diamond disks must be cooled with water or air when used.

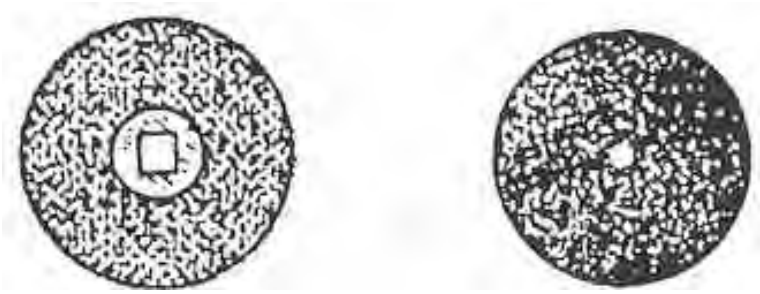


Figure 2-26. Unmounted abrasive disks, screw-in type and snap-on type.

(4) Mounted stones and wheels (WHEEL, ABRASIVE, MANDREL MOUNTED, AHP and SHP). Mounted stones and wheels of diamond or silicon carbide are used for grinding, cutting, and polishing. They are available in ball, cone, inverted cone, cylinder, tapered cylinder, knife-edge, round-edged, and other shapes and sizes (see figure 2-27).

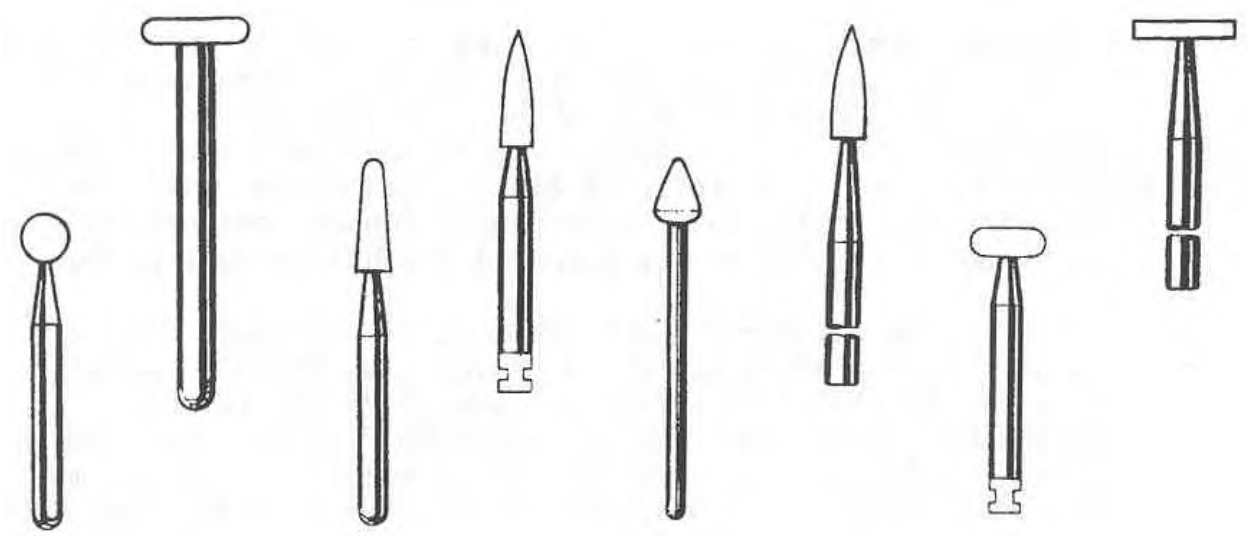


Figure 2-27. Mounted abrasive stones and wheels.

(5) Unmounted abrasive wheels (WHEEL, ABRASIVE, UNMOUNTED). Abrasive wheels of various dimensions and materials are used for grinding, cutting, and polishing.

(6) Rubber polishing wheels (WHEEL, ABRASIVE). Rubber wheels of various sizes, unimpregnated or impregnated with pumice, are used to polish teeth and restorations.

(7) Polishing cups and brushes (CUP, POLISHING, DENTAL HAND- PIECE and BRUSH, BRISTLE, DENTAL HANDPIECE and BRUSH, POLISHING, DENTAL HANDPIECE). These cups and brushes (see figure 2-28) are used to polish teeth and restorations.

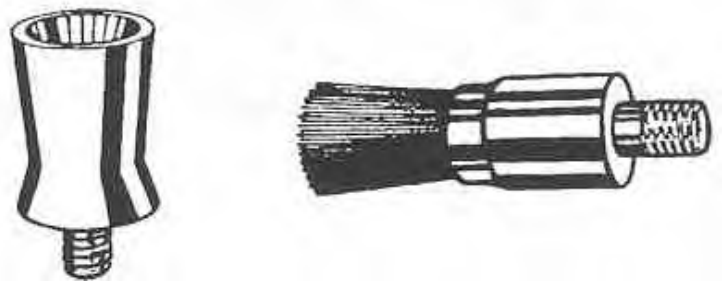


Figure 2-28. Polishing cup and polishing brush.

Section III. INSTRUMENT SETUPS AND PROCEDURES

2-14. GENERAL

The dental specialist in the Restorative Dentistry Section performs duties common to all specialists. His duties are largely related to assisting the dental officer in cavity preparation, placement of restorations, and fabrication, and placement of crowns.

a. **Procedures Vary.** Procedures followed in restorative dentistry vary with the operator, location and extent of the tooth structure to be replaced, and restorative material to be used. Local anesthesia is used routinely by most dental officers. Rubber dam is routinely used by many. Some operators make wax patterns for gold alloy restorations directly in the prepared teeth (direct method) while others make the wax patterns on dies or models produced from impression of the prepared teeth (indirect method).

b. **Instrument Setups Vary.** Each restorative procedure requires a different instrument setup and a different sequence of steps. Dental officers have their individual variations of procedure and favorite instruments. See Appendix A for typical instrument setups. Each dental specialist must learn variations desired by the dental officer he is assisting. The dental specialist will learn, through instruction and experience, to anticipate dental treatment requirements. He will be able to assist and to have instruments and materials ready when needed without being reminded. As a quick reference, the various instruments used for each step of the restorative procedure are listed in Appendix B.

c. **Support Duties Vary.** When not directly assisting the dental officer, there are always support duties that must be done by the dental specialist, such as cleaning and sterilizing instruments, cleaning and straightening the instrument cabinet, sharpening cutting instruments, replenishing supplies, cleaning and lubricating handpieces, changing soiled linens, charting records, and making administrative entries in dental records and other forms.

d. **Assisting During Cavity Preparation.** There is no phase of dental treatment in which a dental officer can better use another set of hands than in the performance of restorative procedures. Ways in which the dental specialist can help during cavity preparation include the following.

(1) Attend to the patient's needs.

(2) Maintain an orderly arrangement of instruments and materials in the work area.

(3) Adjust the light.

(4) Remove from the operative area those instruments and materials that are no longer needed. As time permits, these items should be removed and cleaned.

(5) Wipe instruments free of blood and debris with sterile gauze as they are used.

(6) Provide instruments needed for the next step before they are needed.

(7) Anticipate the dental officer's needs. Using the left hand, be ready to place the next instrument in the dental officer's working hand in the position in which it will be used.

(8) Be familiar with methods of passing instruments.

(9) Use the water and air syringes as desired by the dental officer. Some dental officers employ a water-air coolant spray attachment on the handpiece. Others have the dental specialist direct a stream of water or air into the cavity to reduce the frictional heat of rotating cutting instruments and to keep the cavity free of debris. A stream of air sprayed upon the mouth mirror may be helpful in keeping the mirror free of water and other material that could interfere with the dental officer's vision. The dental officer will occasionally stop to inspect his work. At this time, the assistant usually dries the cavity with the air syringe so the dental officer can see the cavity better.

(10) Keep the operative site free of saliva, water, blood, and debris by proper use of the dental evacuator.

2-15. PLACING A RUBBER DAM

a. **Advantages.** A competent general surgeon would not think of operating before the surgical site was carefully isolated with sterile drape so he may work without interference, distraction, and contamination from adjacent structures. It is equally important that the dentist isolate the teeth during restorative procedures in the mouth. Advantages for the dentist include an isolated, controlled, operative field, improved visibility and a dry field for the manipulation of restorative materials. Patient management is another advantage attributed to rubber dam usage. Here you decrease the time the patient is spitting and rinsing his mouth. This leads to a decreased operating time and an improved quality of the restorations placed. Another advantage associated with rubber dam use is the increased success rate of pulp capping. This is understandable because all or most oral contamination is blocked from the operative site by the rubber dam. In addition, rubber dam usage helps the patient to avoid swallowing or aspirating dental materials.

b. **Disadvantages.** Some of the disadvantages associated with the use of the rubber dam are given below.

(1) When in place, it is uncomfortable for the patient. Although the rubber dam may cause some discomfort, so do most of the other instruments used by the dentist. Therefore, the rubber dam should not be discarded based on discomfort.

(2) Another disadvantage has to do with its application. The rubber dam cannot be applied to all cases for one reason or another. When this happens, only single teeth should be restored.

(3) A psychological disadvantage associated with rubber dam use is the reaction of a claustrophobic patient (fear of being shut up in a confined space).

(4) One of the major drawbacks to rubber dam usage is in the area of occlusal checks. Once the dam is in place, occlusal checks are not possible. This potential disadvantage can be overcome by doing a thorough preoperative inspection of the patient's record before using a rubber dam.

c. **Communication with Patient.** Rubber dam placement begins with an explanation to the patient of what you are going to do. You must tell the patient what a rubber dam is and the advantages of its use.

d. **Preoperative Mouth.** A mouth inspection should be done. This preoperative examination will enable the operator to anticipate most problems before they arise. During this examination, you should check the number of teeth present in the operative area, the alignment of the teeth, and the contact area. The contacts should be examined with floss to see if the dam will clear these areas. If there are any problem areas, you can call them to the attention of the dentist so modifications can be made.

e. **Isolation Procedure.** After you have performed your preoperative inspection, the planned isolation is performed (see figure 2-1 for rubber dam equipment). The proper clamps are selected (Bi Nap, molar [number 8], anterior [number 9], W14A). With an indelible pencil, mark the location of each hole to be punched in the rubber dam. Holes are usually punched for at least one tooth on either side of the one to be prepared. Holes should be marked to conform to the arch arrangement of the teeth and located on the dam so that the dam will be centered on the face with its upper edge lying just below the nose. Usually, dams are premarked with printed dots indicating tooth location. Gauze pads or napkins are fitted around the patient's face to provide ventilation to the skin and to prevent irritation. The patient's lips are coated with a lubricant (such as Vaseline) to prevent them from drying. The dental specialist then selects the appropriate rubber dam clamp for the tooth most distal to the tooth being prepared. He attaches a ligature of dental floss to the clamp and secures the clamp to the rubber dam at the most distal hole punched. He secures the rubber dam frame to the dam and inserts the clamp forceps into the clamp. The dam is then placed in the patient's mouth and the clamp anchored to the appropriate tooth. The remaining dam is secured around the teeth by fitting the septum of the dam interproximally with a strand of dental floss. The dam is then inverted with a placing instrument, such as a stellite numbers 1-2, by forcing the dam material to turn over or invert around the neck (the cervical portion) of each tooth. (The air syringe may also be used to help invert the rubber dam.) The saliva ejector is inserted under the dam and the clamp ligature wound around one of the small posts of the frame to keep it from entering the operative field. Depending on the location of the tooth, the dentist may request that a bite block be inserted for patient comfort.

f. **Procedure for Rubber Dam Removal.** Rubber dam removal is just as important as its application, which means that the same careful planning should be followed for rubber dam removal. The first step in removal should be a clean up of the operative debris, that is, flush the area with water and use suction to remove the debris. After this is done, the ligature must be removed. This could be accomplished by cutting it with scissors. Very carefully, stretch the dam and cut the dam septum. Next, the clamp is removed, followed by removal of the head strap. The rubber dam and frame are now removed from the oral cavity. The patient's mouth should be wiped. At this point, allow the patient to rinse his mouth. After you have allowed your patient to rinse his mouth, allow him a brief rest period (30 seconds). Now check the occlusion and make those corrections needed. Before the patient is dismissed, make a final inspection of the operative site.

g. **The Team Approach.** In the team approach, the rubber dam is placed in the mouth by the dental officer and the dental specialist working together, each following prearranged steps in the procedure. This procedure is explained in detail in the Subcourse MD0510, General Duties of the Dental Specialist.

2-16. CAVITY PREPARATION

a. **General**. Cavity preparation is largely a mechanical procedure in which hand excavating instruments and motor driven burs, disks, and stones are used to remove caries and debris and to cut and shape tooth structure. Speeds used with rotating cutting instruments vary from the range of 4,000 to 10,000 revolutions per minute (rpm) to "high" speeds of 500,000 rpm or more. Instruments and techniques vary with the speeds. The dental specialist should be familiar with these differences and be prepared to adapt readily to assist in the use of any technique.

b. **Instrument and Material Setup.** Specific instruments used in cavity preparation will be determined by the dental officer's preference and by the location of the cavity and the type of restorative material to be used. Instruments and materials used in preparing the cavity for an amalgam restoration include the contra-angle hand piece and appropriate hand instruments and burs, stones, and disks.

c. **Procedure**

(1) Resistance form, retention form, and convenience form. The dental officer will begin each procedure by selecting one of the burs previously discussed and then outlining the cavity preparation. This establishes the general outline that the preparation will take or how it will appear on the surface of a tooth. The bur used to accomplish this procedure will depend on the dental officer's preference. The bur that might be used is the inverted cone bur, straight fissure bur, or tapered fissure bur. After outlining the cavity preparation, the dental officer will want to obtain the resistance and retention forms. Though resistance and retention are not the same, both are accomplished at the same time. Resistance form is a form whereby the tooth and the

restoration are able to resist the normal forces of mastication regardless of loss of tooth structure caused by caries and cavity preparation. Retention form is a form that tends to prevent dislodgment of the restoration and is characterized by lock, dovetails, and undercuts. This step may also be accomplished with a small round bur, inverted cone bur, or tapered fissure bur. Convenience form will be accomplished at this time to obtain access for removing the remaining decay and to facilitate placement of the restorative material.

(2) High speed procedures. Use of high speed cutting instruments reduces cutting time, increases operator control of the instrument (no tendency to bind, wedge, or hop), lessens patient apprehension, and reduces operator strain and fatigue.

(a) Control of heat. The main clinical problem in restorative dentistry is the heat generated during the cutting of the tooth. Temperatures high enough to damage the pulp can be developed at any speed, but, because elevated temperatures develop more rapidly at higher speeds, greater care and attention must be given to heat control. Operating at speeds up to 4,000 rpm and applying moderate force may be done without generating too much heat, but at greater speeds, coolants must be used. Streams of water, air, or mixture of air and water are used as coolants. Air is effective only in the lower ranges of high speeds. For higher speeds, a spray or stream of water must be used. In addition to lowering the temperature in the field of operation, the coolant carries away debris produced by the cutting operations of the bur and helps prevent clogging of the bur's cutting surface. Instruments so cleaned cut more rapidly and last longer. A number of devices have been developed for delivering the coolant to the cutting site by the handpiece. These may be attached to or built into the handpiece. The dental officer may prefer not to use such a device or one may not be available. In this case, the dental specialist must apply the coolant with a hand-held water syringe.

(b) High-speed hand pieces. Hand pieces designed to operate at speeds up to 8,000 rpm will not operate satisfactorily at higher speeds. Increased speed, therefore, has required greater precision in manufacture and replacement of sleeve-type bearings with ball, roller, or needle bearings. Care of the handpiece, which was always important, has become even more critical.

(c) High velocity evacuation. Since high-speed handpieces require a continual flow of water for cooling during cavity preparation, there is a need for more efficient removal of water from the oral cavity than is possible with the saliva ejector. One method employs a suction apparatus that uses a vacuum pump to remove large volumes of saliva, water, and debris through a tube and mouthpiece of large diameter. Thus, high velocity suction can be achieved with little suction pressure. A number of mouthpieces have been designed for different operations in different locations of the mouth. The mouthpiece of this instrument functions best when handled by the chair assistant. Advantages of this system are that it relieves tension of the patient by keeping fluids out of his throat and relieving the need to use the cuspidor, helps to keep the operating field dry and the mirror clean, and saves time by eliminating rinsing.

(3) Removal of decay. The next major step that the dental office will perform is the removal of the bulk of decay. Here he will be taking out the carious dentin and other debris in the cavity itself. The dental officer might choose to use burs in this step of the procedure. Rather than using burs, the dental officer might use hand instruments, excavators being the instruments used to accomplish this procedure. The dental officer can choose from several pairs of excavators. He might choose the large pair of Black's excavators number 63 and number 64 or the smaller pair of Black's number 65 and number 66. These are paired instruments, the face of which has parallel sides and a concave surface. The other excavators that might be used are the smaller pair of Darby-Perry number 5 and number 6 or the larger pair number 21 and number 22. The face of the Darby-Perry excavator is shaped much like a rounded spoon. The shape of the working end of all these excavators makes them ideal for scooping out decayed dentin and debris.

(4) Finishing. In the next step, the dental officer will finish the cavity preparation by cleaving unsupported enamel walls and, where needed, establish bevels on the proximal surface at the cervical seat(s) of the prepared cavity. The dental officer might employ hand instruments. He could use the large pair of mono-beveled hatchets number 51 and number 52, or the small pair number 53 and number 54. These are called "mono-beveled" because there is only a single bevel on the blade of the instrument. They are also paired instruments (if the dental officer used one, he will probably use the other). The other hatchet that might be used is the bi-beveled hatchet number 17. Looking at the cutting edge, you will notice that it is sharpened on both sides, thus creating a bevel (angle) on both sides of the blade. The dental officer might also choose to use any of the chisels available to him. The bin-angled chisels have a sharp bend in the shank and the blade itself is wider than the shank. Bin-angled chisels are number 81 and number 83, either one of which may be placed out in the setup. The straight chisels that might be used are numbers 84, 85, and 86. Chisel number 84 is the largest and number 86 the smallest of the set. Only one of these is required for the setup. Some chisels are put out as a pair. These are the Wedelstaedt numbers 41 and 42. They have a graceful curve in the shank down to the cutting edge rather than a distinct bend or angle, as did another set of chisels we have already discussed. The cutting edge is on opposite sides of the blade, indicative of numbers 41 and 42.

(5) Trimming. Sometimes when finishing the cavity preparation, the dental officer will find it necessary to bevel the enamel at the cervical seat. Gingival margin trimmers are used to accomplish this. These instruments are also used in pairs. There are a pair of mesial gingival margin trimmers and a pair of distal gingival margin trimmers. They are so designated because they can be used on only one of the two proximal surfaces. The mesial gingival margin trimmers have the sharp point of the cutting edge on the convex side of the blade. The distal gingival margin trimmers have the cutting edge on the concave side of the blade. Both the mesial and distal trimmers are made in large and small sizes.

2-17. AMALGAM RESTORATIONS WITH CEMENT BASE

a. **General.** Preparing and restoring teeth with silver amalgam is the dental treatment procedure performed most frequently. The properties of silver amalgam are determined largely by how it is handled. Optimum properties can be achieved only through careful attention to details in its preparation and manipulation. Since the dental specialist normally is responsible for the measurement, preparation, and initial handling of the material, the manner in which he carries out these procedures can determine the success of the restoration. In addition, the manner in which he assists the dental officer in the performance of other steps of the restorative operation influences the quality of the results.

b. **Instrument and Material Setup.** The instruments and materials should not be introduced into the working area until just before they are needed. Instruments used for preceding steps and no longer needed should be removed from the working area. A typical setup for a Class II amalgam restoration includes the instruments and equipment shown in figure 2-29. Class I restorations normally will not require the matrix material.

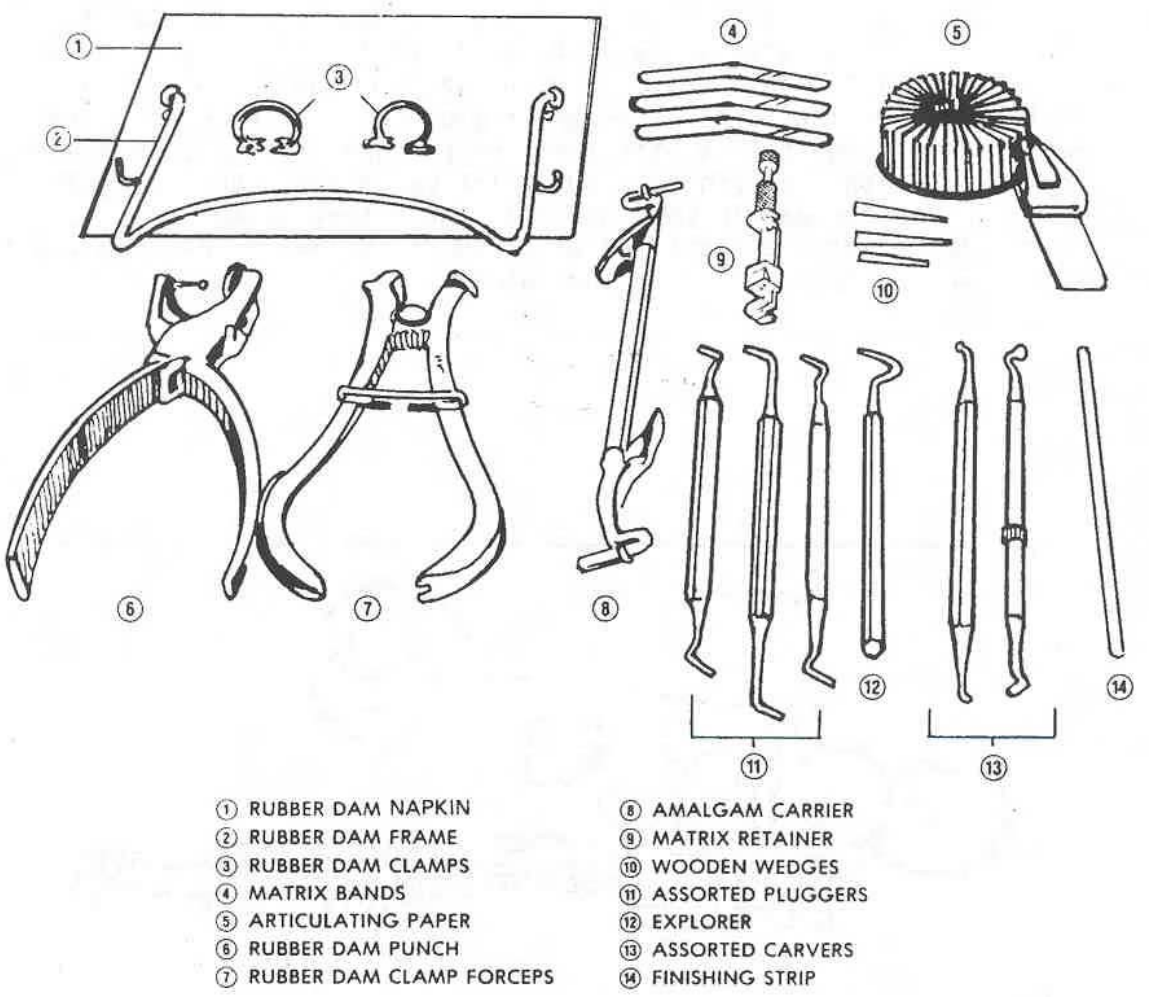


Figure 2-29. Instruments and materials for Class II amalgam restorations.

c. **Preparing and Placement of Cement Base**.

(1) General. It is common practice to insert a low thermal conducting cement material as a base in deep portions of cavities underlying metallic restorations to insulate the pulp against thermal and electrical shock and pressures induced during placement of the restorations. Zinc phosphate cement is the material most used for this purpose.

(2) Assisting procedures. When the dental officer is finishing the cavity preparation, he will direct the dental specialist to prepare the base. The dental specialist manipulates the material in accordance with the manufacturer's directions and the general techniques discussed in a previous subcourse. A thick mix is normally used for this purpose. When the dental specialist has completed the mix to the desired consistency, it is presented to the dental officer. Usually, the mix is scraped from the spatula onto the center of one edge of the glass slab. Some dental officers may want the glass slab placed on the bracket table while others may want it held by the specialist while the dental officer takes the amount of material required. Some excess powder should remain for the dental officer's use in placing the base. Upon completion of the placement of the base, the dental specialist should remove the slab and spatula from the operative area. If zinc phosphate is used as a base, a glass slab (which should have a "Z" or "ZP" etched on the side) with a matched set of zinc phosphate powder and liquid is used. There are several other base materials that may be used; most of these will be mixed on paper or parchment mixing pads. You will also need a stainless steel spatula in mixing all of the base materials. To carry and pack the cement into the preparation requires the use of one of several cement pluggers available to the dental officer. One of the more commonly used pluggers is the Ladmore plugger number 3, which has teardrop shaped working ends on both ends of the instrument. The Woodson pluggers number 1, number 2, and number 3 may also be used. Both nibs of the Woodson number 1 are flat, one in the same plane of the shank and the other at a slight angle to the shank. The Woodson number 2 has a cylinder-shaped plugger on one end and a paddle-shaped nib on the other. A Woodson number 3 has nibs similar to the Woodson number 2 except that the cylinder-shaped nib is larger. Many dental officers will prefer to use a much smaller base instrument called the "Dycal instrument." This instrument is furnished by certain manufacturers with their base materials. It is much shorter and smaller than the others previously discussed and has a beaded end to the nib.

d. **Placement of a Metal Matrix Band.**

(1) Proper placement of amalgam requires condensation by applying strong pressure to the surface of the amalgam with amalgam pluggers. In cavities involving more than one tooth surface, it is usually necessary to surround the tooth with a matrix band to help confine the restorative material to the cavity preparation during condensation. The matrix band also helps determine proper contours and the location and form of proximal contacts in the restored tooth. A number of types of matrix retainers are available. Many are designed to be used with matrix bands premade in assorted sizes and configurations. Matrix bands may also be tailored individually from matrix band material and tied or otherwise held in place on the tooth. When the matrix is in place on the tooth, a wedge or wedges are often used to hold the band tightly against the neck of the tooth on proximal surfaces involved in the cavity preparation (see figure 2-30). The wedge keeps the amalgam from squeezing out under the matrix band and into the interproximal space or spaces. Some dental officers use red or green stick impression compound to add further support and rigidity to the matrix.

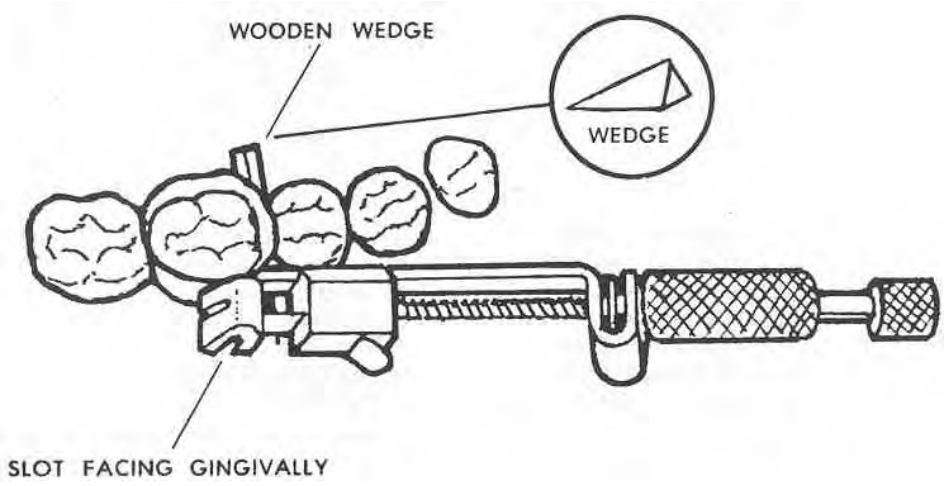


Figure 2-30. Wooden wedge.

(2) The assistant, with the dental officer, will prepare materials designed to replace the missing walls of a cavity preparation and to shape or protect the restoration. Placing a matrix for an amalgam restoration will allow the dental officer to insert the restorative material without exceeding the limits of the normal tooth structure. The most common type is the Tofflemire matrix retainer and band. This comes in two parts--a small stainless steel band that encircles the tooth and the instrument that holds the band in place (called the Tofflemire retainer). Note that the number 1 Universal band is doubled over when it is placed in the retainer. In assembling and placing the matrix, there are three essential rules to follow. First, the small opening of the band must point toward the cervical portion or root of the tooth. Secondly, the slotted side of the retainer always points toward the root of the tooth to facilitate the removal of the retainer after the restorative material has partially set or crystallized. Finally, the retainer is usually positioned on the facial side of the tooth being worked on (in the vestibule).

(3) However, when you are assigned to a clinic, you may find that these rules are not always followed or applied as they are described here. For example, the dental officer might desire to use the retainer in the mouth proper rather than in the vestibule. However, the majority of dentists will use it according to rules that we have given you. You may also encounter other matrix retainers. You may find that the dental officer you are assisting will not always use the number 1 Universal band. There are bands for molars (larger bands) and for bicuspids (smaller bands). In any case, you must learn how to assemble the retainer and band. You must also know how to adjust the size of the band by turning the adjusting screw, which is the inner screw on the retainer, as well as assembling the set and tightening the band in place. This is done with the securing screw, which is the outer screw on the retainer. In some instances, the restorative material may actually be placed before applying the matrix.

e. **Preparing Amalgam.** The dental specialist then prepares the amalgam in accordance with the manufacturer's instructions and general techniques discussed previously. The manner in which the assistant handles the dental amalgam will have much to do with the success of the resulting restoration. Correct trituration time and avoidance of moisture contamination are important steps in producing the material with the best properties.

f. **Filling the Cavity.** In an amalgam restoration, the amalgam will be prepared in an amalgamator; the dental officer can place the amalgam into the preparation with the amalgam carrier. This instrument has a barrel type nib that is used to pick up and transfer the amalgam from the squeezed cloth to the mouth.

CAUTION: Remember, never to touch the amalgam with your hands.

(1) Once it is placed in the restoration, the amalgam must be condensed. This is done with amalgam pluggers. The two pluggers are the Black's number 1 and number 2. They both have round-shaped plugger ends with the end of the number 2 somewhat larger than the number 1. The alternate pluggers take different shapes on the working ends. The dental specialist loads the amalgam carrier with the amalgam and places it in the dental officer's operating hand in the position in which he will carry it to the tooth. The dental specialist then picks up the first amalgam plugger in his right hand. When the dental officer is ready for the plugger, the dental specialist takes the amalgam carrier from him and replaces it with the plugger. While the dental officer is condensing the first segment of amalgam, the dental specialist loads the carrier with the next segment. In this way, the cavity is filled segment by segment with the dental specialist alternately passing the loaded amalgam carrier and appropriate instruments to the hand of the dental officer.

(2) When the cavity is sufficiently filled, the dental specialist selects the appropriate carving instruments and hands them one at a time to the dental officer as needed. The exchange of instruments between the hands of the assistant and operator is done to keep the dental officer's hands close to the patient's mouth and to foster rapid and smooth accomplishment of the operative procedure.

(3) When the matrix material has been removed from the mouth, the dental specialist should also be prepared to rinse the patient's mouth as necessary during and after final carving procedures.

g. **Finishing and Polishing Amalgam Restorations**

(1) Amalgam covers. Finally, the dental officer is ready to finish the restoration. In this step, he will complete the procedure so that patient is able to function normally. In placing the amalgam, the dental officer will overfill the preparation during the condensation phase to obtain sufficient bulk of material to carve the amalgam down to the original contour of the tooth. He will use amalgam carvers to contour the partially crystallized amalgam. He may employ the Hollenback number 3, the cleoid number 92, and the discoid number 89. The Hollenback number 3 has two grain-shaped blades. The cleoid carver has only one blade, a concave pointed oval that resembles a claw (in the Medical Supply Catalog this instrument is listed as a claw excavator). The discoid amalgam carver has a single blade that is round or disc-shaped (discoid).

(2) Articulating paper. The final item is articulating paper. It closely resembles blue carbon paper and is issued in a roll or package form. Desired lengths are cut from the roll or selected from the package and the patient is instructed to bite down normally with the strip of articulating paper over the occlusal surfaces of the teeth. Any high spots in the patient's occlusion will be detected by noting blue spots on the teeth. The dental officer may have a patient return for final finishing and polishing of the amalgam restoration 24 or more hours after its insertion. This is done to eliminate small excesses of amalgam that may have been left overhanging cavity margins, to refine occlusal contours of the restoration, and to develop a smooth, shiny surface that will resist contamination and formation of surface oxides.

(3) Materials. Finishing and polishing is done with fine polishing disks and strips, green stones, finishing burs, chalk, and other fine polishing agents. An old contra-angle hand piece is operated at slow speed along with "wet" solutions (mixtures) of polishing materials to minimize heat production. Heat produced during the polishing could weaken the surface of the amalgam. Rubber polishing cups and polishing brushes are commonly used to apply the polishing materials.

NOTE: Figure 2-31 outlines steps of procedure for the dental specialist and the dental officer when preparing amalgam restorations with a cement base.

2-18. COMPOSITE RESIN RESTORATIONS

a. **General.** Composite resin is commonly used as a restorative material in anterior teeth because of its resistance to wear and its excellent aesthetics. The design of the cavity preparation will differ from the design of the amalgam, but most of the dental specialist's duties will be the same as those when amalgam is used. See figure 2-32 for steps of procedure when preparing restorations made of composite resin.

PROCEDURE	DONE BY: Dental Specialist	DONE BY: Dental Officer	COMMENTS
Basic exam and amlagam instruments provided.	x		
Topical anesthetic provided.	x		If used by dental officer.
Syringe with local anesthetic provided.	x		Avoid displaying syringe to the patient.
Anesthetic administered.		x	Cartridge should be warmed for greater patient comfort.
Rubber dam setup provided	x		Includes dam, clamps, punch, and rubber dam forceps.
Rubber dam applied.	x	x	Four hands often needed here.
Teeth prepared using high-speed burs with water spray.		x	Water spray is used to reduce the heat.
Provide high speed evacuation and air dry.	x		Water and debris must be removed during tooth preparation.
Matrix setup assembled and provided.	x		Matrix needed in Class II restorations.
Matrix placed and wedged.		x	Dental specialist should select and provide wedge.
Base mixed and provided with placing instrument.	x		If base is requested by dental officer.
Base placed.		x	
Instruments for placing retentive pins provided.	x		If requested by dental officer.
Cavity varnish applied.		x	
Amalgam prepared.	x		Prepared according to Chapter 7 and manufacturer's directions.
Amalgam moved to amalgam well, then loaded into carrier and handed to the dental officer.	x		Move quickly, and avoid touching the mix with the hands.
Amalgam placed in cavity; carrier returned to dental specialist.		x	Refer to description of "team approach."
Amalgam plugger handed to dental officer.	x		Refer to description of "team approach."
Carving instruments provided.	x		Dental officer will indicate choice of carver.
Area cleaned of debris.	x		Excess amalgam removed in carving should be evacuated.
Rubber dam removed.		x	
Articulating paper provided.	x		
Occlusion checked.		x	
Patient drape removed and chair adjusted for patient dismissal.	x		This is a good time to remind the patient to avoid chewing gum on the new restoration for 24 hours.

Figure 2-31. Restorative dentistry procedures--cement-based amalgam.

PROCEDURE	DONE BY: Dental Specialist	DONE BY: Dental Officer	COMMENTS
Basic exam and composite resin instruments provided.	x		
Topical anesthetic provided.	x		If used by dental officer.
Syringe with local anesthetic provided.	x		Avoid displaying syringe to the patient.
Anesthetic administered.		x	Cartridge should be warmed for greater patient comfort.
Rubber dam setup provided.	x		Includes dam, clamps, punch, and rubber dam forceps.
Rubber dam applied.	x	x	Four hands are often needed.
Teeth prepared using high-speed burs with water spray.		x	Water spray is used to reduce the heat.
Provide high-speed evacuation.	x		Water and debris must be removed during tooth preparation.
Provide matrix and wedge. If crown form is used, provide small scissors.	x		Dental officer will request specific matrix. If crown form is used, dental officer will trim and vent the crown form.
Calcium hydroxide base mixed and provided with placing instruments.	x		If base is requested by dental officer.
Base placed.		x	
Provide materials for acid-etch techniques.	x		If requested by dental officer.
Enamel etched with acid to increase retention.		x	Acid allowed to remain on tooth for 1 minute.
Tooth thoroughly washed to remove acid, then air dried.	x		
Restorative material mixed and provided to dental officer.	x		Manufacturer's directions should be closely followed. Dental officer may request that material be placed in special syringe for greater ease in placement.
Matrix placed and wedged.		x	If crown form used, restorative material should be placed directly in the crown form and the preparation.
Composite resin placed in preparation and stabilized with matrix.		x	
Matrix removed, restoration finished, and rubber dam removed.		x	
Articulating paper provided.	x		
Occlusion checked.		x	
Patient drape removed and chair adjusted for patient dismissal.	x		

Figure 2-32. Restorative dentistry procedures--composite resin.

b. **Varieties of Matrices.** Composite resin restorations require some kind of matrix to hold, shape, and protect them against stain and moisture contamination. Metal matrices, if used in conjunction with resin restorations, would stain the resin. Celluloid, which is issued in roll form, is normally the matrix of choice for proximal restorations. The celluloid matrix strip is approximately three-eighths of an inch wide and is cut to the desired length. Another celluloid-type matrix that is used with resin restorations is the cervical matrix. It is cylindrical or tabular in shape and is generally used on the facial and lingual surfaces of anterior teeth. This matrix offers the same protection against contamination as do the celluloid strips. Crown forms are also made of celluloid and are shaped to match the morphology of the tooth. They come in numbered sets that vary in size, depending on the size and shape of the tooth involved. These crowns may also be used to prepare a temporary crown, to contain a sedative filling, or as a matrix for other types of restoration. If necessary, these crown forms may be modified and cut to fit the tooth being worked on. In order to hold many of these matrices in place and help them conform to an irregularly shaped tooth, a small wedge of wood is commonly used. Thus, always include a selection of wooden wedges in any setup.

c. **Mixing Composite Resins.** Composite resins have largely replaced unfilled acrylic resins because they last longer and have more desirable properties. They usually have a calcium hydroxide base. They are also very simple to mix and use. Most of these restorative kits contain the mixing instructions and mixing materials. If a crown form is not used to place the material, a plastic-coated plugger may be used. In using any of the composites, it is always wise to follow the manufacturer's instructions. Failure to do so may result in a faulty restoration.

d. **Completing the Restoration.** If resin is the restorative material, the matrix will be removed and then the restoration will be smoothed and polished. Initially, the dental officer may want to trim the resin restoration with a surgical scalpel. Therefore, a scalpel handle and a surgical knife blade should be included in the setup. For the remaining finishing to be done, different finishing materials may be used depending on the nature of the restoration. Proximal resin restorations are finished with abrasive strips known as cuttlefish strips. They vary in width from one-sixteenth to three-sixteenths of an inch and are six inches in length. These are available in three grits--fine, medium, and coarse. Cervical resin restorations are usually finished by using sandpaper disks mounted on a snap-head type mandrel. The disk mounted on a mandrel is used in conjunction with the handpieces. The snap-head mandrel is readily identified by its pyramid-shaped head over which the disc with a brass fitting will snap into place.

e. **Alternative Finishing.** A restoration of one of the composite resins may be initially trimmed with a surgical knife and surgical knife blade. Other finishing may be done with some type of finishing bur or with a diamond cone or abrasive wheel that is used in conjunction with handpieces. White and green stones may also be used for this procedure. After using the stones, cuttlefish strips and fine sandpaper disks might be employed as a final finishing measure.

2-19. INTERMEDIATE RESTORATIVE MATERIAL RESTORATIONS

If a matrix is required for intermediate restorative material (IRM), the preceding materials and rules for amalgam restorations may be applied for it also. Intermediate restorative material is the restorative material used in most temporary restorative procedure cases. The IRM will be mixed on a parchment pad with a stainless steel spatula. The techniques and standards for mixing IRM have already been discussed in a previous subcourse. After the assistant has mixed the materials, the dental officer will place it in the preparation with the cement plugger of his choice. Intermediate restorative material is finished with the same instruments used to finish amalgam restorations.

2-20. GOLD ALLOY INLAYS (CROWNS)

a. **Wax Pattern Procedures: General.** In making a gold alloy inlay or crown, the dental officer first prepares the tooth to receive the restoration. The next step is obtaining a wax pattern. A wax pattern is an exact duplicate in wax of what is desired in the finished restoration. Most wax patterns will be used to form a mold into which melted gold alloy is cast to form the inlay or crown. Wax patterns are used also in the formation of acrylic resin crowns. Wax patterns may be obtained by either of two methods. The direct method is one in which softened inlay wax is applied directly to the prepared tooth and carved to shape directly in the mouth. The indirect method is one in which an accurate impression is made of the prepared tooth and adjacent teeth, the impression is poured to provide a cast of these teeth, and the wax pattern is developed on the cast. Ways in which the dental specialist may assist vary with the dental officer and the technique followed.

b. **Direct Method.** In some classes of cavities, the dental officer may use a matrix to replace the missing walls of the cavity to help confine and shape the wax when it is forced into place. The matrix is lubricated so that wax will not stick to it and distort the pattern. When the matrix is in place, the dental officer will soften a piece of wax in the flame or warm water and then force it into place in the cavity. In making a crown or for some inlay techniques, a copper band may be fitted to the tooth, filled with softened wax, and forced into place upon the tooth carrying the wax into all areas of the preparation. After the wax has been allowed to cool, it is shaped and carved, using wax spatulas and carvers, to approximate the anatomy and outline desired in the final restoration. The matrix material or band is removed some time before final finishing of the wax pattern. When carving is completed and the pattern is to be used to produce a cast gold alloy restoration, a sprue is attached to the wax pattern by heating the sprue metal, placing it in contact with the pattern, and permitting the wax to harden around it. After the wax pattern is withdrawn from the tooth, the free end of the sprue is inserted into a sprue former. A sprue usually is in the form of a straight piece of metal. A sprue former is a cone-shaped device of rubber or metal. The sprue and crater former are used to support the wax pattern during subsequent procedures in which the pattern is invested in a plaster-like casting investment to form a mold. The sprue and sprue former also form a passage into

the mold for later laboratory procedures. The wax pattern will undergo dimensional changes with time so it should be invested as soon as possible. Investing, wax-elimination, and casting are normally done by a dental prosthetic specialist. In a small clinic having no dental prosthetic specialist, the dental officer or even the dental specialist may perform these steps. These procedures are described in more detail in TC 8-226, Dental Laboratory Specialist.

c. **Indirect Method.** This technique includes the making of an impression of an individually prepared tooth and, in most cases, several adjacent and opposing teeth. An individual tooth impression is usually made in a copper matrix band that has been selected for size and adapted to the tooth. Either silicone or polysulfide base impression material is normally used for an impression of an individual tooth. An impression of several teeth is usually made in an impression tray with polysulfide base impression material or reversible (agar) hydrocolloid. To secure maximum detail, the dental officer normally uses special syringes, which the dental specialist has filled with the impression material of choice, and ejects the material into the prepared areas.

d. **Procedures for Impression Material.**

(1) Reversible (agar) hydrocolloid. The dental specialist prepares the impression material in strict accordance with the manufacturer's instructions and general techniques discussed in Subcourse MD0502. When the material has been conditioned for making the impression, the dental specialist passes the loaded syringe to the dental officer who then fills the prepared area. While the dental officer accomplishes this step, the dental specialist scrapes the water soaked outer layer of agar from the material in the tray and passes it to the dental officer who makes the impression. The dental specialist aids in the gelation of material by connecting one of the plastic tubes extending from the tray to the tumbler water supply system and places the other tube in the cuspidor bowl. The tumbler supply valve is then turned on, circulating the cool water through the tray and gelling the hydrocolloid. After the impression is removed from the mouth, the dental specialist should wash the saliva from its surface with cool tap water or cool slurry water (solution of plaster of Paris or artificial stone and water). The dental specialist should take precautions to avoid distortions or damage to the tissue and peripheral border areas of the impression. He should make sure the impression is poured immediately to prevent distortion of the impression, which would result in an inaccurate cast. In a dental clinic that has no dental prosthetic specialist, the pouring of the cast may become the responsibility of the dental specialist.

(2) Polysulfide base impression material. The dental specialist prepares the impression material according to the manufacturer's instructions and general techniques discussed in Subcourse MD0502. Normally, a double-mix technique is used. The dental specialist mixes the syringe material, loads the syringe, and passes it to the dental officer. While the dental officer is injecting the material into the prepared area, the dental specialist mixes the heavy- or medium-bodied material and loads the customized tray. The dental specialist receives the syringe with one hand and passes the loaded tray to the dental officer who makes the impression. When the impression is removed from the mouth, the dental specialist washes saliva from the surface with cool tap water or cool slurry water. Dimensional stability is greater in polysulfide base impression material than in the hydrocolloid impression materials. However, the dental specialist should make sure that the impression is poured within one hour. Pouring the cast may become the responsibility of the dental specialist when no dental prosthetic specialists are assigned to the clinic.

e. **Laboratory Procedures.** Various types of casts are made from these impressions. These include master casts with removable dies (model of the individual tooth), split casts, and other types. The master cast is made of artificial stone while the dies may be made of "die" stone, electroplated metal, or (sometimes) amalgam. Wax patterns are made on the dies. The cast formed from an impression of the opposing teeth are used to establish occlusal relationship. The master cast is used to establish proximal relationships between the wax pattern and other teeth. Many dental officers will have the patient return for a "try-in" of the wax pattern before it is sprued and invested. Laboratory procedures involved are described in TC 8-226, Dental Laboratory Specialist.

f. **Finishing and Cementing Cast Gold Alloy Restorations.**

(1) General. When gold alloy crowns and inlays have been cast and removed from the investment, they are ready to be carried to place in or on the prepared tooth where they receive final fitting and polishing.

(2) Technique. The sprue may be cut from the casting before it is placed in the prepared cavity or it may be left in place to aid in handling the casting, then cut off later. Often, a few taps with the mallet and orangewood stick are needed to carry the casting to place. Sometimes a small "bubble" of gold on the inner surface of the casting keeps the casting from going into place and must be removed. Initial steps in fitting and finishing the casting include adjustment of occlusion, removal of excess material from margins and contours, refining occlusal anatomy, and establishing proper contacts with adjacent teeth. Occasionally, it is necessary to build up contact areas by the addition of a small amount of gold solder. When these finishing procedures are completed, the restoration is smoothed and polished. When ready for cementing, both the tooth and restoration are thoroughly cleaned and dried, the tooth is isolated with cotton rolls, copalite varnish is applied, zinc phosphate cement (loose mix) is prepared, the cement is applied to the tooth surface of the restoration, and the restoration is carried to the tooth and tapped firmly in place using the mallet and orangewood stick. The restoration is held in place with firm biting or other pressure until the cement has reached its initial set.

2-21. USE OF ALTERNATE INSTRUMENTS

There are alternate instruments that may be used in place of many of the ones we have discussed. When you get in the clinic you will discover others. What we hope to do here is give you some familiarity with the basic instruments and materials and the order in which they are used. When you get to a permanent duty clinic, it will be your responsibility to add to the information presented here so that you can efficiently assist the dental officer.

Continue with Exercises

EXERCISES, LESSON 2

INSTRUCTIONS: The following exercises are to be answered by marking the lettered response that best answers the question or best completes the incomplete statement.

After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers.

1. Regarding restorations:

   a. Endodontic treatment is sometimes performed in the restorative section.

   b. The main purpose of a restoration is esthetic appearance.

   c. Silicate cement is the most commonly used permanent restorative.

   d. Zinc phosphate cement is used as a permanent restorative.

SPECIAL INSTRUCTIONS: For exercises 2 through 9, match the characteristics or material associated with restorations in column A with the appropriate restorations and restorative materials term in column B. Items in column B may be used more than once.

COLUMN A	COLUMN B
____ 2. For thermal insulation.	a. Permanent restoration.
____ 3. For isolation of teeth.	b. Temporary restoration.
____ 4. IRM.	c. Crown.
____ 5. Silver amalgam.	d. Fixed partial denture.
____ 6. Gold restoration covering 3/4ths of a tooth.	e. Pulp cap.
____ 7. Calcium hydroxide.	f. Cement base.
____ 8. Porcelain restoration covering all surfaces of the tooth.	g. Rubber dam.
____ 9. Uses crowns to secure it.	

SPECIAL INSTRUCTIONS: For exercises 10 through 14, match the characteristic of cavity classification in Column A with the cavity classification in Column B.

COLUMN A		COLUMN B	
____ 10.	Pits on cuspal tips of posterior teeth.	a.	Class I.
____ 11.	Cavities involving proximal surfaces of posterior teeth.	b.	Class II.
		c.	Class III.
____ 12.	Pits or fissures on occlusal surfaces.	d.	Class IV.
____ 13.	Cavities involving proximal surfaces of anterior teeth.	e.	Class V.
____ 14.	Cavities involving incisal angles of anterior teeth.	f.	Class VI.

15. The crosscut fissure burs are in the _____ series.

    a. 10.

    b. 30.

    c. 500.

    d. 700.

SPECIAL INSTRUCTIONS: For exercises 16 through 23, match the characteristic of instruments used for cavity preparations in column A with one of the instruments used for cavity preparations in column B. Items in column B may be used more than once.

COLUMN A	COLUMN B
____ 16. Used to cleave enamel along the lines of the enamel rods.	a. Spoon excavators.
____ 17. Darby-Perry Nos. 5, 6, 21, 22.	b. Enamel chisels.
____ 18. Used to bevel the enamel at the cervical seat of the cavity preparation.	c. Gingival margin trimmers.
____ 19. Wedelstaedt Nos. 41 and 42.	
____ 20. Black Nos. 81, 83-86.	
____ 21. Used to remove debris and decayed dentin from the cavity.	
____ 22. Black Nos. 77-80.	
____ 23. Black Nos. 63-66.	

24. Which instrument(s) would be used to cleave enamel?

    a. Enamel chisel.

    b. Enamel hatchet.

    c. Hoe.

    d. "a" or "b" above.

    e. "a" or "b" or "c" above.

SPECIAL INSTRUCTIONS: For exercises 25 through 33, match the characteristic of instruments used for filling prepared cavities in column a with one of the instruments used for filling prepared cavities in column B. Items in column B may be used more than once.

COLUMN A	COLUMN B
____ 25. Used to place cements.	a. Cement spatulas.
____ 26. Used to mix and handle cements.	b. Cement pluggers.
____ 27. Beale No. 7.	c. Amalgam carriers.
____ 28. Supplied by the manufacturer with the kit.	d. Amalgam pluggers.
____ 29. Woodson Nos. 1-3.	e. Wax spatulas.
____ 30. Used to carry silver amalgam into the prepared cavity.	f. Dycal instrument.
____ 31. No. 324.	
____ 32. Used to condense amalgam in a cavity preparation.	
____ 33. Chrome-cobalt stellite instruments.	

SPECIAL INSTRUCTIONS: For exercises 34 through 42, match the characteristic of carving and finishing instruments in column A with one of the carving and finishing instruments in column B. Items in column B may be used more than once.

COLUMN A	COLUMN B
____ 34. Used to finish the margins and polish restorations.	a. Amalgam and wax carvers.
____ 35. Tanner number 5, a double-ended instrument.	b. Discoid/cleoid carvers.
____ 36. Black No. 8.	c. Knives.
____ 37. Used for excavation of carious dentin as well as carving of amalgam and wax.	d. Burnishers.
____ 38. Used to polish gold or other metals with a round steel point.	e. Finishing burs.
____ 39. Hollenback Nos. 1-3.	f. Abrasive disks.
____ 40. Come in various shapes, such as oval, bud, and sugarloaf.	g. Mandrels.
____ 41. Used to hold disks and wheels during their use.	
____ 42. Can be used for rapid cutting of enamel or fine polishing of restorations.	

43. In assisting the dental officer with restorative procedures:

    a. You will use the water and air syringes as desired by the dental officer.

    b. The same instrument setup is used with each procedure.

    c. The TM prescribes which instruments the dental officer must use.

    d. Your duties are limited to setting up and cleaning the instruments.

44. When the rubber dam is properly inserted, which of the following steps is performed first?

    a. Place the dam in position.

    b. Punch the holes into the rubber dam.

    c. Check the alignment of the teeth and the contact area.

    d. Coat the patient's lips with a lubricant.

    e. Place the rubber clamp on the most distal tooth with the clamp forceps.

    f. Insert the saliva ejector.

    g. Mark holes on the dam to conform to the arch arrangement of the teeth.

45. In planning for the cavity preparation, the dental officer must consider the following:

    a. The general outline as it will appear in the excavated cavity of the tooth.

    b. The retention form whereby the tooth and its restoration are able to resist the normal forces of mastication.

    c. The resistance form which tends to prevent dislodgement of the restoration.

    d. The convenience form to facilitate the removal of decay and the placement of restorative material.

46. Handpieces with an rpm of _____ require a coolant.

    a. 8000.

    b. 4000.

    c. 2000.

    d. 1000.

47. If the cavity preparation is performed in the appropriate order, which of the procedures below is done first?

    a. Beveling the enamel at the cervical seat.

    b. Cleaving unsupported enamel walls.

    c. Outlining the cavity preparation.

    d. Removing the bulk of decay.

48. In placing an amalgam restoration, which of the following actions is a proper procedure?

    a. Matrix materials are included in the setup for a Class I restoration.

    b. All excess zinc phosphate powder is removed from the glass slab after mixing.

    c. Trituration time and moisture contamination can determine the properties of silver amalgam.

    d. Pressure on the amalgam must be avoided.

49. In resin restorations:

    a. Metal matrices are required to hold and shape them.

    b. Wooden wedges are included in the setup.

    c. Using the bulk flow method, the material is mixed as it is placed in the cavity.

    d. The snap-head mandrel is the abrasive used for finishing.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES

1. a (para 2-1, 2-2))
2. f (paras 2-2h, 2-17c(1))
3. g (para 2-2i)
4. b (para 2-2c)
5. a (para 2-2b)
6. c (para 2-2e)
7. e (para 2-2g)
8. c (para 2-2e)
9. d (para 2-2f)
10. f (para 2-3f)
11. b (para 2-3b)
12. a (para 2-3a)
13. c (para 2-3c)
14. d (para 2-3d)
15. c (para 2-9a(1)(b))
16. b (para 2-10c)
17. a (para 2-10b)
18. c (para 2-10e)
19. b (para 2-10c)
20. b (para 2-10c)
21. a (para 2-10b)
22. c (para 2-10e)

23. a (para 2-10b)

24. d (para 2-10c, d)

25. b (para 2-12b)

26. a (para 2-12a(1))

27. e (para 2-12a(2))

28. f (para 2-12c)

29. b (para 2-12b)

30. c (para 2-12d)

31. a (para 2-12a(1))

32. d (para 2-12f))

33. b (para 2-12b)

34. e (para 2-13c(1))

35. b (para 2-13a(3))

36. c (para 2-13b(2))

37. b (para 2-13a(3))

38. d (para 2-13b(1))

39. a (para 2-13a(2))

40. e (para 2-13c(1))

41. g (para 2-13c(2))

42. f (para 2-13c(3))

43. a (para 2-14d(9))

44. c (para 2-15d)

45. d (para 2-16c(1))

46. a (para 2-16c(2)(a))

47. c (para 2-16c(1))

48. c (para 2-17e)

49. b (para 2-18b)

End of Lesson 2

LESSON ASSIGNMENT

LESSON 3	Surgical Instruments.
LESSON ASSIGNMENT	Paragraphs 3-1 through 3-36.
LESSON OBJECTIVES	After completing this lesson, you should be able to:

3-1. State the responsibilities of the dental specialist in respect to oral surgery.

3-2. Identify the types of extraction forceps and the use of each.

3-3. Name the types of root elevators.

3-4. Name the types of periosteal elevators.

3-5. Identify the purpose of curettes.

3-6. Name the types of rongeur forceps.

3-7. Name the types of bone files.

3-8. Identify the uses of surgical mallets.

3-9. Name the types of bone dental chisels.

3-10. Identify the uses of surgical burs.

3-11. Identify the uses of surgical scissors.

3-12. Identify the uses of surgical knives.

3-13. Identify the use of an irrigating syringe.

3-14. Identify the uses of gingival retractors.

3-15. Identify the use of suture needles.

3-16. Identify the use of the dental aspirator.

3-17. Define the following and their use:

a. Dressing forceps.
b. Sponge forceps.
c. Instruments.
d. Hemostats.
e. Needle holders.
f. Towel clamps.

3-18. Identify the use of the surgical instrument stand.

3-19. State the preparations made by the dental specialist to receive patients.

3-20. Name the methods used to extract teeth.

3-21. Identify the procedures used for arranging a surgical tray.

3-22. Define the meaning of the term alveolectomy.

3-23. Identify the procedures used in the treatment of fractures.

3-24. State the postoperative treatment of fractures.

3-25. Identify the procedures used in assisting the dental officer during surgery.

3-26. State the postoperative care for the patient who has undergone surgery for removal of a tooth or teeth.

SUGGESTION

After studying the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 3

SURGICAL INSTRUMENTS

Section I. INTRODUCTION

3-1. GENERAL

Oral surgery is that specialty of the dental profession concerned with diagnosis, surgical and adjunctive treatment of disease, injuries, and defects of the jaws and associated structures. Because of the nature of this specialty and the equipment used, the oral surgery service is often established in a less traveled area of the clinic. Patients undergoing surgical treatment should be isolated from patients receiving routine dental treatment.

3-2. ASEPSIS AND CLEANLINESS

Because surgical procedures expose susceptible areas of tissues to invasion by bacterial organisms, strict attention must be paid to cleanliness and aseptic techniques. All instruments, equipment, dressings, and medication must be carefully sterilized and protected from any contamination that might later be introduced into a surgical site. Possible sources of contamination must be minimized through continual attention and adherence to cleanliness of area, equipment, and personnel. Any time we deal with open wounds, proper sterilization and handling of instruments cannot be over emphasized. Before using these instruments, they should be properly sterilized and maintained in a sterile condition throughout the operation. The sterile instrument forceps should always be used when transferring sterile instruments from one point to another. A sterile towel should be under all instrument setups. When the operation is completed, the instruments should be washed thoroughly. If they are not to be sterilized immediately, they should be thoroughly dried to prevent rusting.

3-3. THE DENTAL SPECIALIST AS AN ASSISTANT IN ORAL SURGERY

In addition to some general clinical duties, the dental specialist in oral surgery performs a number of specialized duties. The nature of many of his duties will depend upon his capabilities, the technical procedures followed by the dental officer, and the ways in which the dental officer wishes his assistant to participate. The effective assistant is the one who takes an interest in his work and tries to become familiar with instruments, equipment, procedures, and techniques. He establishes rapport with patients, maintains personal and area cleanliness and appearance, and anticipates and carries out the dental officer's needs so that unnecessary delays are avoided. Thorough familiarity with instruments and materials used for specific operative procedures is of particular importance in the oral surgery section. One reason for this is that surgical setups are commonly prepared, packed, and autoclaved ahead of time. From an examination of the patient's record, the experienced oral surgery assistant can usually determine what

instruments and materials will be required for the operation and have them ready when needed. Many oral surgeons perform certain operations in a surgical operating room of a hospital, often using general anesthesia. The dental specialist may be expected to perform preparatory procedures, assist in surgery, and clean the operating room after surgery. Therefore, he must be familiar with pertinent basic and local hospital operating room procedures.

Section II. INSTRUMENTS

3-4. GENERAL

The most frequently performed procedure in oral surgery is the extraction of teeth. A large proportion of oral surgery instruments are designed and used for the extraction of teeth and tooth roots and the associated removal and contouring of alveolar bone. Commonly used oral surgery instruments and equipment are discussed in this lesson. Medical Supply Catalog nomenclature is included in capital letters in parentheses following the name ordinarily used for each item. Syringes and needles used for local anesthesia are found in on the Universal Data Repository (UDR) (Medical Catalog on CD-Rom), class 6515 items. The instrument and materials setups illustrated in this lesson are typical and may be varied as necessary.

3-5. EXTRACTION FORCEPS (FORCEPS, TOOTH EXTRACTING)

a. **General.** Extraction forceps are used in the removal of teeth. Variations in these instruments are caused by differences in root shape, size, number, alignment of the tooth, and location in the mouth. Except for those designed for some specific operations, forceps generally follow certain basic principles. They are distinguished by the angles of the beaks, the notches on the beaks, the contour, and the number engraved on the forceps.

b. **Maxillary Anterior Forceps.**

(1) Forceps number 65 is a bayonet-shaped forceps with pointed nibs used primarily to remove crowded maxillary incisors and root fragments (figure 3-1).

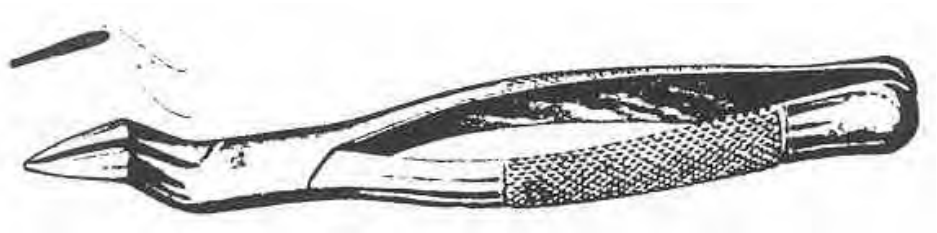


Figure 3-1. Forceps No. 65.

(2) Forceps number 150S is an S-shaped forceps designed for maxillary anterior and bicuspid teeth and roots (figure 3-2). The Universal Forceps number 150A also is S-shaped and used to extract all maxillary teeth.

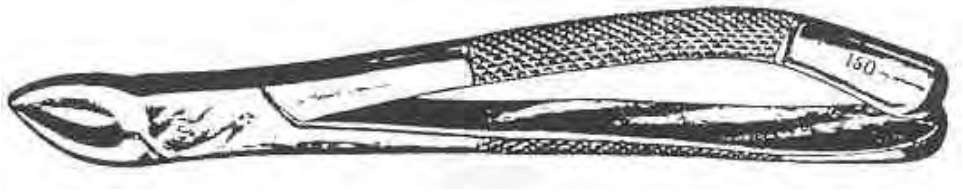


Figure 3-2. Forceps No. 150S.

(3) Forceps number 286 is a bayonet-shaped forceps (figure 3-3). It is used primarily for extracting maxillary anterior teeth and roots. It may be used for bicuspids.

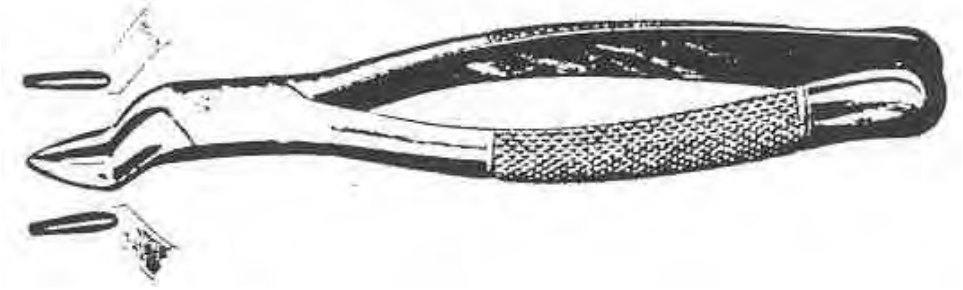


Figure 3-3. Forceps No. 286

(4) Forceps #1 (Winter) is no longer in the Medical Supply Catalog, but you may see it in clinics.

c. **Maxillary Posterior Forceps.**

(1) Forceps number 150S may also be used for maxillary bicuspids.

(2) Forceps numbers 53R and 53L are bayonet-shaped forceps designed for maxillary first and second molars. Number 53R is designed for teeth on the right side of the maxillary arch, number 53L for teeth on the left side (figure 3-4).

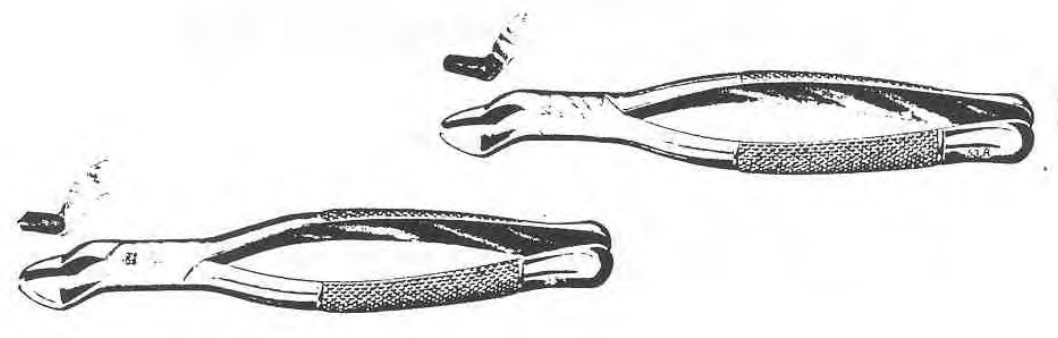


Figure 3-4. Forceps numbers 53R and 53L.

(3) Forceps number 210 has a hooked handle. It is a bayonet-shaped forceps designed for maxillary third molars (figure 3-5).

Figure 3-5. Forceps number 210.

d. **Mandibular Anterior Forceps.**

(1) Forceps number 151S is a canoe-shaped universal forceps used to extract all mandibular anterior teeth (figure 3-6).

Figure 3-6. Forceps number. 151S.

(2) Forceps number 203 is used for extracting mandibular anterior teeth, bicuspids, and roots (figure 3-7).

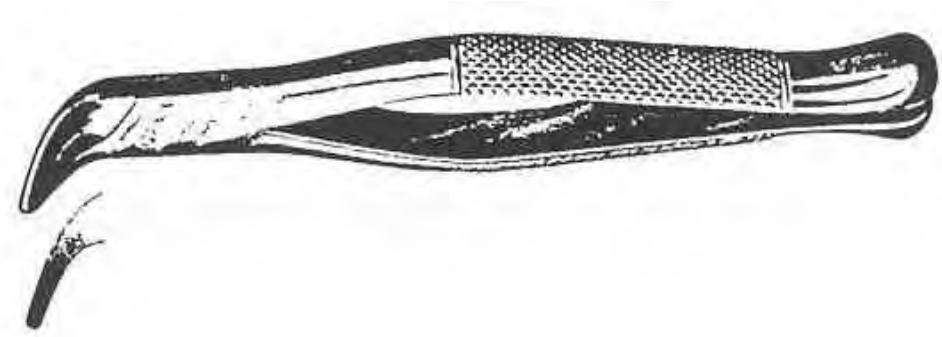


Figure 3-7. Forceps number 203.

e. **Mandibular Posterior Forceps**.

(1) Forceps numbers 151S, and 203, as noted above may be used for mandibular bicuspids. See figures 3-6 and 3-7.

(2) Forceps number 15 has a hooked handle (figure 3-8). It is designed for mandibular first and second molars.

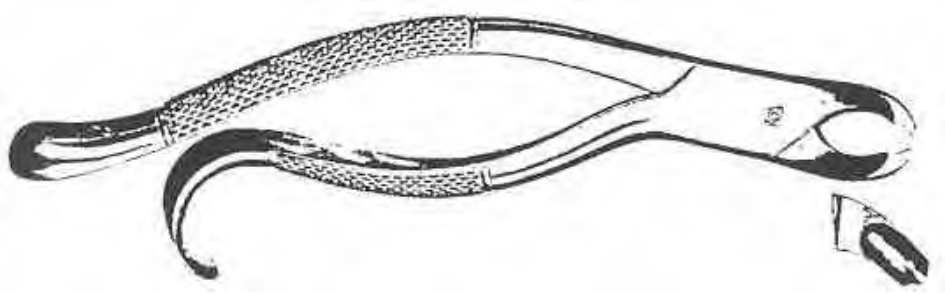


Figure 3-8. Forceps number 15.

(3) Forceps number 222 has L-shaped beaks. It is designed for mandibular third molars (figure 3-9).

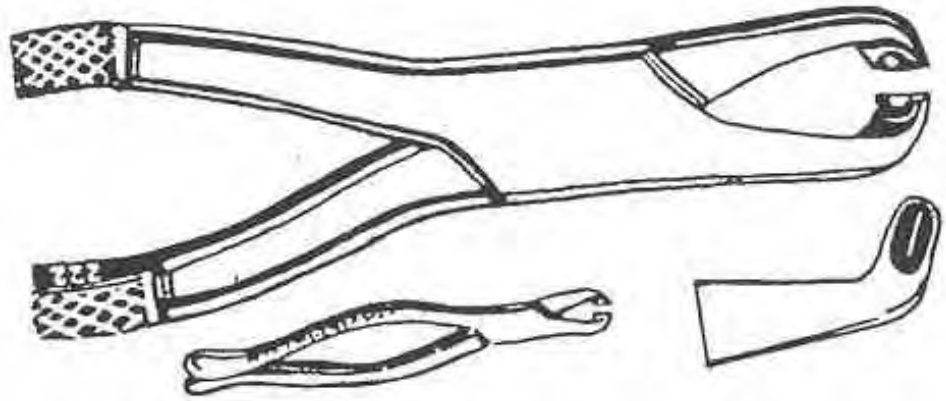


Figure 3-9. Forceps number. 222.

(4) Forceps number 217 has cow horn-shaped beaks and a hooked handle (figure 3-10). It is designed for mandibular molars.

Figure 3-10. Forceps number 217.

(5) Forceps number 16 is no longer in the Medical Supply Catalog, but you may see it in clinics.

3-6. ROOT ELEVATORS (ELEVATOR, ROOT)

Root elevators are instruments designed to loosen or remove roots, root fragments, or teeth. As with forceps, a variety of designs are available to suit different teeth, techniques, and locations in the mouth.

a. **Stout A Elevator.** This elevator's nib is flat on one side and rounded on the other. The nib has straight tapering walls and a rounded end (figure 3-11).

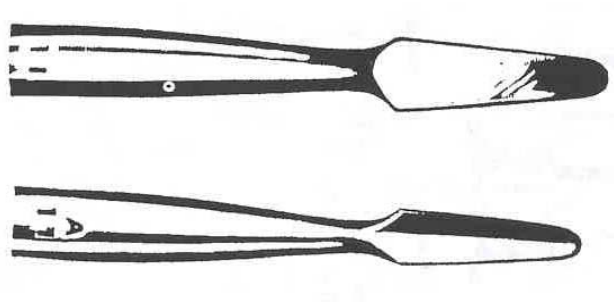


Figure 3-11. Stout A elevator.

b. **Straight Elevator Number 34-S.** This elevator is straight and shaped like a gouge (figure 3-12). In cross-section its nib is crescent-shaped. It is one of the most commonly used elevators.

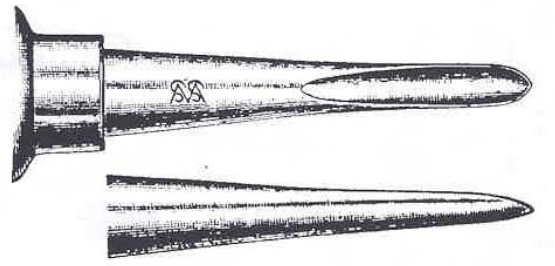


Figure 3-12. Straight elevator number 34-S.

c. **Straight Elevator Number 301.** This elevator is similar in shape to but smaller than number 34-S (figure 3-13).

Figure 3-13. Straight elevator number 301.

d. **Apical Fragment Root Elevators**. These are used to remove apical root fragments (figures 3-14 and 3-15).

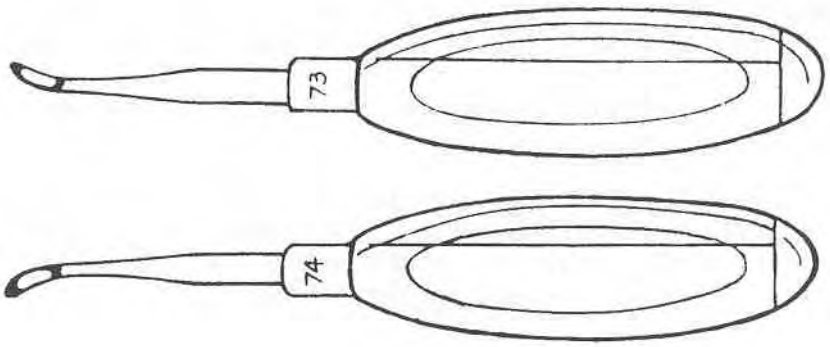


Figure 3-14. Miller root elevators numbers 73 and 74.

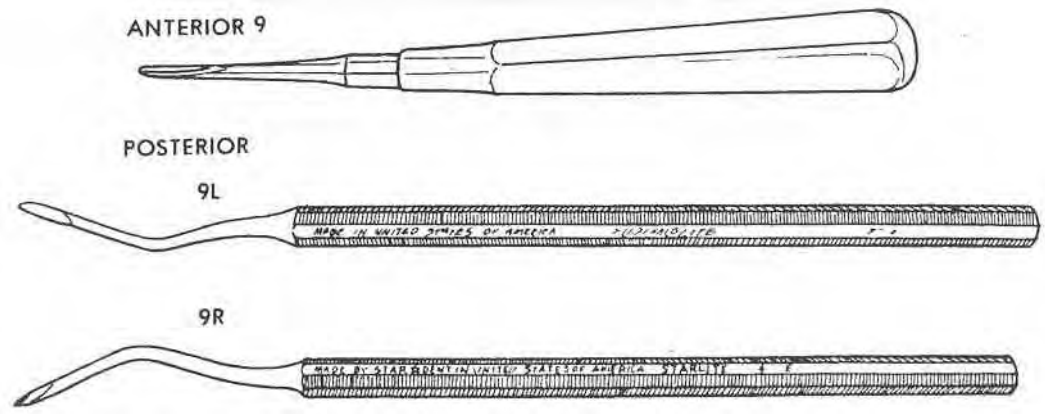


Figure 3-15. Apical fragment root elevators.

3-7. PERIOSTEAL ELEVATORS (ELEVATOR, PERIOSTEAL)

Periosteal elevators are used to separate and raise periosteum from the surface of the bone and retract the tissue flap (see figure 3-16).

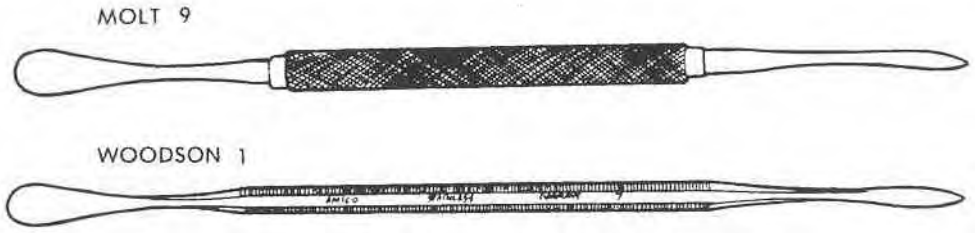


Figure 3-16. Periosteal elevators.

a. **Woodson Plastic Instrument Number One (PLUGGER, PLASTIC)**. This is a restorative instrument often used as a periosteal elevator in oral surgery.

b. **Spatula Number Seven.** This wax instrument also is often used as a periosteal elevator. It is blunt on one end and pointed on the other.

c. **Molt Periosteal Elevator Number Nine**. This elevator has a curved, blunt blade at each end.

d. **Seldin Periosteal Elevator Number 22.** This elevator has a flat handle with a small blade at each end. The blades are angled and shaped to give easy access to all locations in the mouth. All edges are rounded slightly to avoid needless injury to the tissues.

3-8. CURETTES (CURETTE, ALVEOLAR)

Curettes (figure 3-17) are instruments designed to remove extraneous material from tooth sockets and other spaces in the alveolar bone. Their nibs are spoon-shaped and their shanks are angled to reach different areas of the mouth. Standard curettes include Molt curettes 1, 2, 4, (anterior) and 5L, 6R, 9L, 10R (posterior).

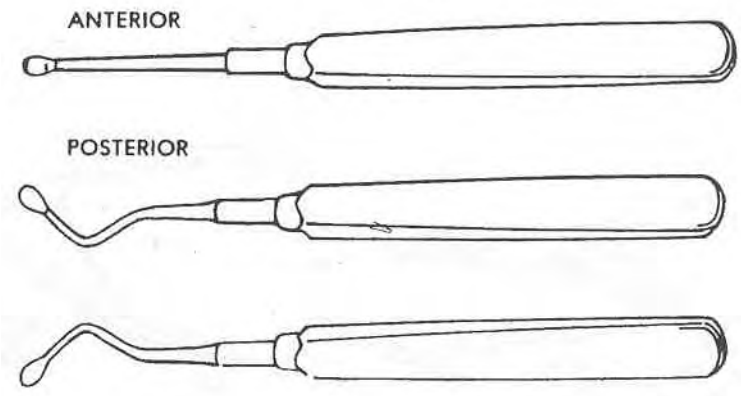


Figure 3-17. Curettes.

3-9. RONGEUR FORCEPS (RONGEUR)

Rongeur forceps are cutting instruments designed to cut and contour bone (figure 3-18). Springs located between their handles separate their beaks when closing pressure is not being applied. The dentist may ask for a single rongeur.

a. Rongeur number 1A is both a side and end cutting instrument.

b. Rongeur number 4A is a side cutting rongeur.

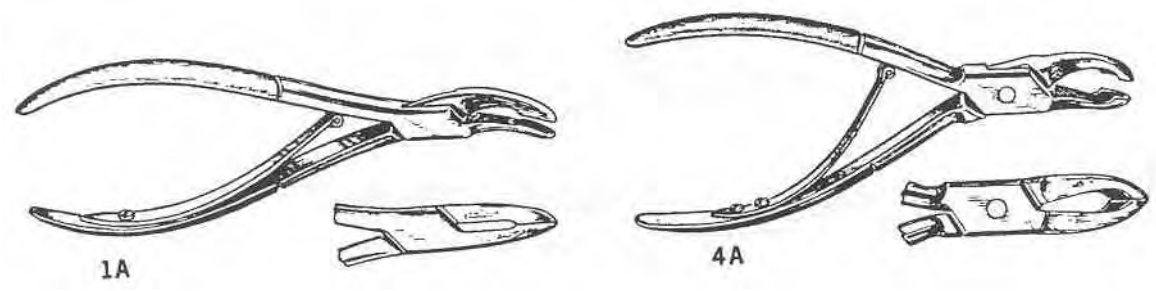


Figure 3-18. Rongeur forceps.

3-10. BONE FILES (FILE, BONE)

Bone files are made in various sizes. They are used to smooth the edges of bone. Seldin bone file number 11 (figure 3-19) is double-ended, with the file surface at one end being larger than the file surface at the other end.

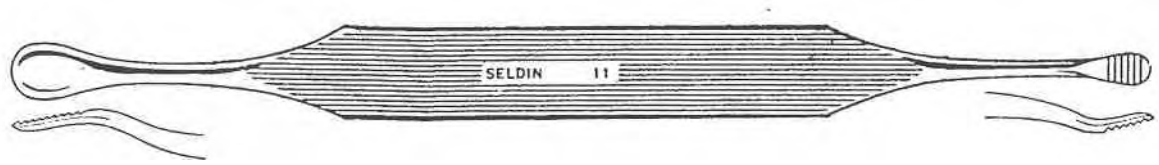


Figure 3-19. Bone file.

3-11. BONE CHISELS (CHISELS, DENTAL)

Bone chisels are used to remove bone or section teeth. Some are designed for use with a hand mallet. Another type is driven by a special handpiece, described in paragraph 3-12 as an engine-driven oral surgical mallet. Chisels must be kept sharp to be effective.

a. Stout chisels numbers 1, 2, and 3 are straight bone chisels used with a hand mallet. They differ in the size of their blades.

b. Chisel points used with the engine-driven surgical mallet are made in different shapes, designed for various surgical procedures. These include two bone removing points, one unibevel and one bibevel, one gouge and two tooth elevator points.

3-12. SURGICAL MALLETS (MALLET, ORAL SURGERY)

The oral surgical hand mallet (figure 3-20) is a double-headed mallet resembling a gavel or wood mallet. The engine-driven oral surgical mallet (impactor) fits on the arm of the dental engine like a straight handpiece. It is equipped with five detachable impactor points.

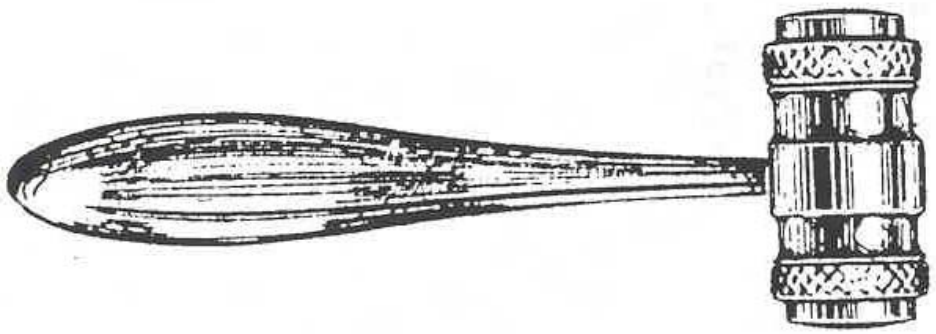


Figure 3-20. Surgical mallet.

3-13. SURGICAL BURS (BUR, DENTAL SURGERY)

Specially designed surgical burs (figure 3-21) are used by many oral surgeons to remove bone and to groove teeth for controlled sectioning. They are made for both the straight and contra-angle handpiece. Steel bur number 41 is available for AHP or SHP. The tungsten carbide bur is available for SHP only. To avoid excessive heat while cutting, sterile water should be dripped over the bur.

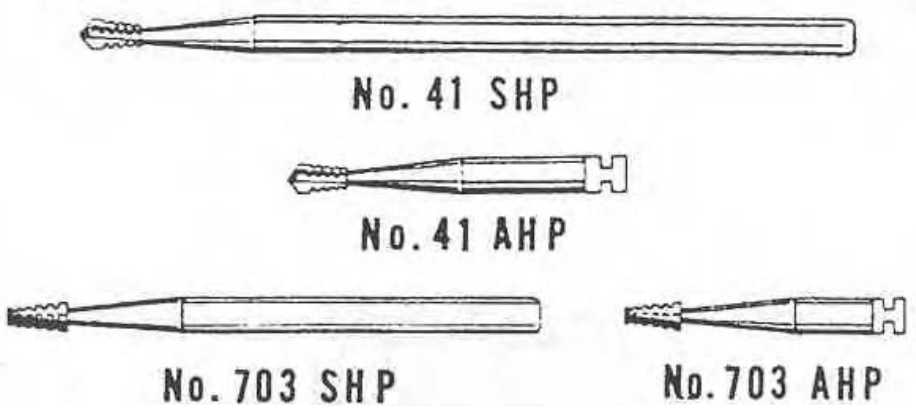


Figure 3-21. Surgical burs.

3-14. SCISSORS (SCISSORS, COLLAR AND CROWN) (SCISSORS, ORAL SURGICAL)

Utility scissors (figure 3-22) are ordinary scissors usually made of stainless steel and used for miscellaneous cutting. Suture scissors have small curved blades and are used to cut suture material in the mouth. Tissue (saw-tooth) scissors have long curved handles and short serrated jaws suitable for cutting soft tissue.

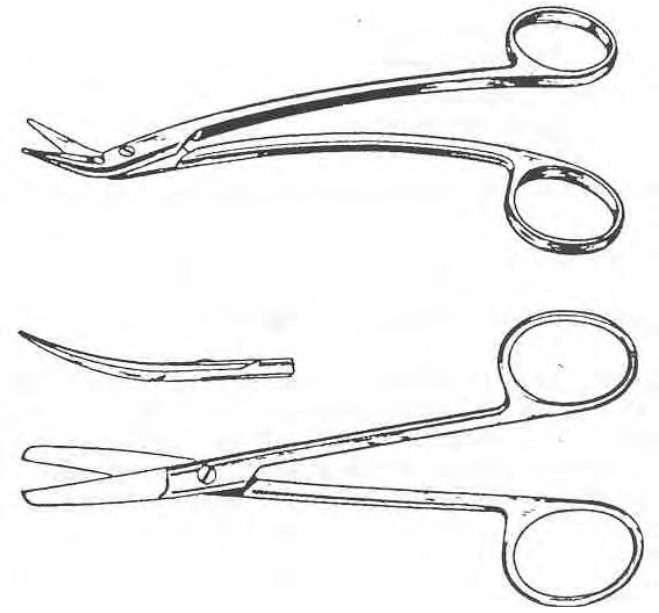


Figure 3-22. Scissors.

3-15. SURGICAL KNIVES (HANDLE, SURGICAL KNIFE) (BLADE, SURGICAL KNIFE)

Surgical knives (figure 3-23) are used to cut soft tissue and incise localized abscesses. A surgical knife is comprised of a handle and interchangeable blades. Four sizes and shapes of detachable blades and three types of handles are available and listed in the Medical Supply Catalog under class 6515 items. Blade number 12 is curved and blade numbers 15 is straight.

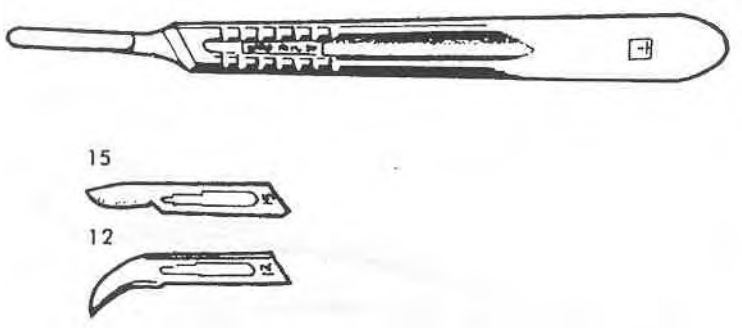


Figure 3-23. Surgical knife handle and blades.

3-16. SUTURE NEEDLES (NEEDLE, SUTURE)

Many different types of suture material can be attached to different shapes and sizes of needles. Suture needles are use to carry suture material through soft tissue which, when tied, will hold tissue parts together for initial healing. Suture needles are available in a variety of sizes and forms listed in the Medical Supply Catalog under class 6615 items. Figure 3-24 shows an example of a needle and suture material.

Figure 3-24. Suture material and needle.

3-17. GINGIVAL RETRACTORS (RETRACTOR, GINGIVAL)

Gingival retractors are used to hold gingival flaps back and out of the way to expose operative areas. Thoma gingival retractors 1 and 2 are two-pronged, fork-like retractors. Instruments designed for other purposes, such as periosteal elevators (figure 3-16), are also used as retractors.

3-18. IRRIGATING SYRINGE (SYRINGE, IRRIGATING, DENTAL)

Irrigating syringes (figure 3-25) are used to wash pus, debris, and other extraneous material from tooth sockets, cavities, or inflamed gingival flaps. The tip is usually metal and should be blunt. If a syringe with a glass barrel is used, particular care must be exercised; the glass barrel could shatter if it is hit with a surgical bur.

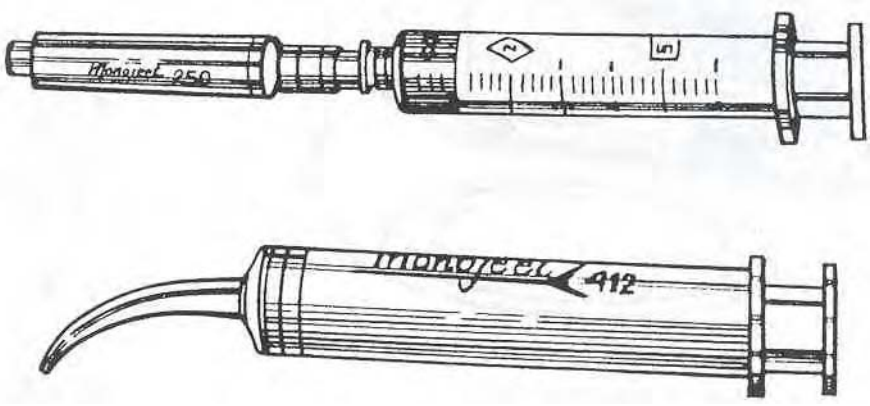


Figure 3-25. Irrigating syringes.

3-19. DENTAL ASPIRATOR (SUCTION APPARATUS, DENTAL)

The dental aspirator (figure 3-26) is an electrically operated vacuum suction unit used to maintain a clear operating field by removing blood, bone chips, debris, and other materials. The unit is fitted with a tube running from a vacuum bottle that ends in a handle and suction tip. The handle fitted with a suction tip is controlled by the oral surgery assistant in the removal of extraneous material from the surgery site.

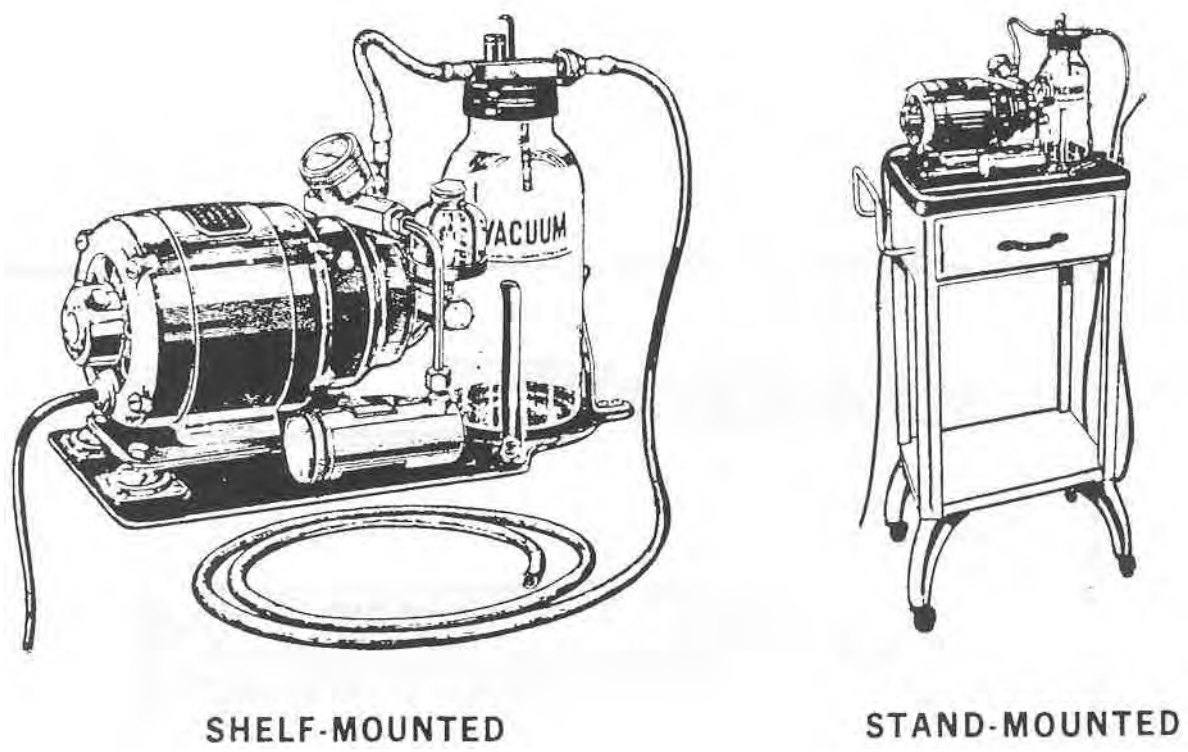


Figure 3-26. Dental aspirators.

3-20. DRESSING FORCEPS (FORCEPS, DRESSING)

Dressing forceps (figure 3-27) have the appearance of large tweezers. They are used to handle sterile dressings inside the mouth.

Figure 3-27. Dressing forceps.

3-21. SPONGE FORCEPS (FORCEPS, GAUZE PAD HOLDING)

Sponge forceps (figure 3-28) are large and doughnut-shaped nibs. They are used to handle sterile dressings or linen outside the mouth.

NOTE: The forceps in paragraphs 3-21 through 3-25 are listed in the Medical Supply Catalog under class 6515 items.

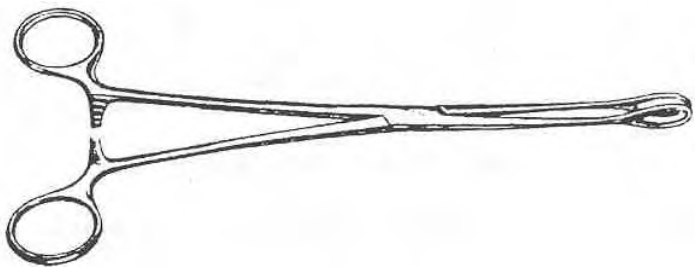


Figure 3-28. Sponge forceps.

3-22. INSTRUMENT FORCEPS (HOLDER, FORCEPS)

Instrument forceps (figure 3-29) have prong-like nibs resembling a knife and fork. They are used to handle sterile instruments.

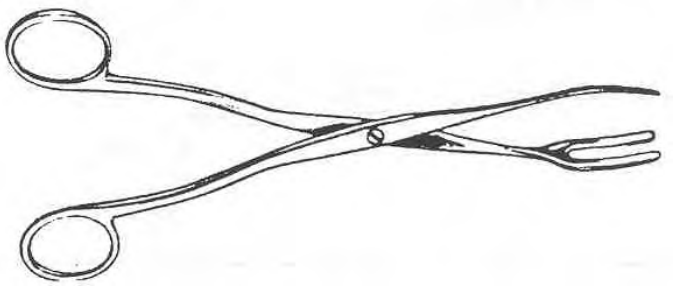


Figure 3-29. Instrument forceps.

3-23. HEMOSTATS (FORCEPS, HEMOSTATIC)

Hemostats (figure 3-30) are small forceps designed to stop the flow of blood by clamping blood vessels. A hemostat is used for holding material and tissue.

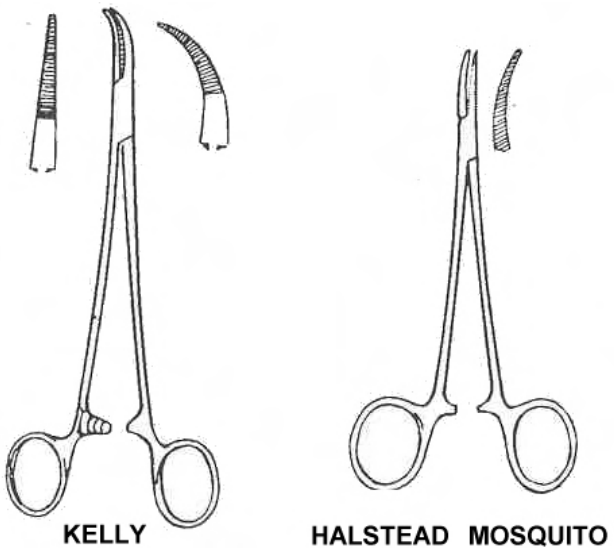


Figure 3-30. Hemostats.

3-24. NEEDLE HOLDERS (HOLDER, SUTURE NEEDLE)

Needle holders (figure 3-31) are forceps resembling straight hemostats. Each jaw has a groove on its inner surface, which is used to hold and manipulate the suture needle during suturing.

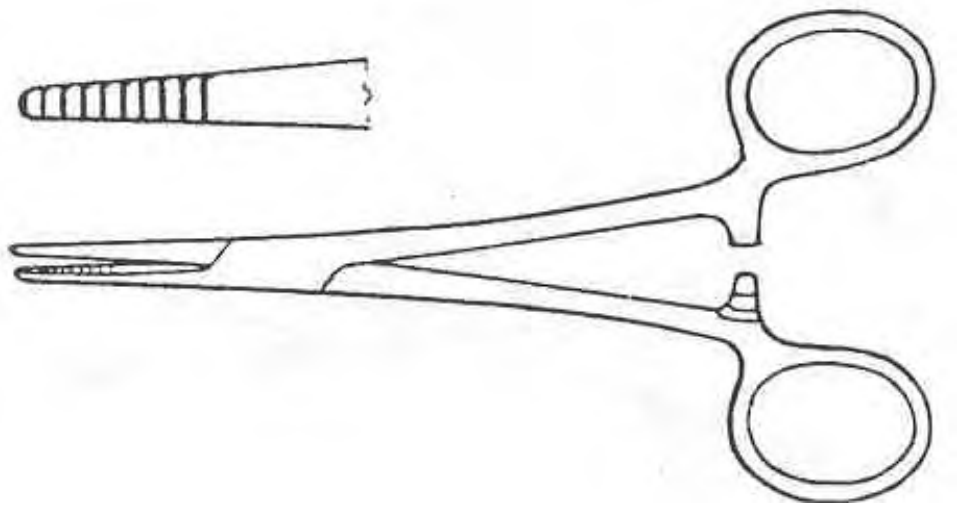


Figure 3-31. Suture needle holder.

3-25. TOWEL CLAMP (FORCEPS, TOWEL)

Towel clamps (figure 3-32) are small forceps with curved, claw-like jaws used to hold surgical drapes in place.

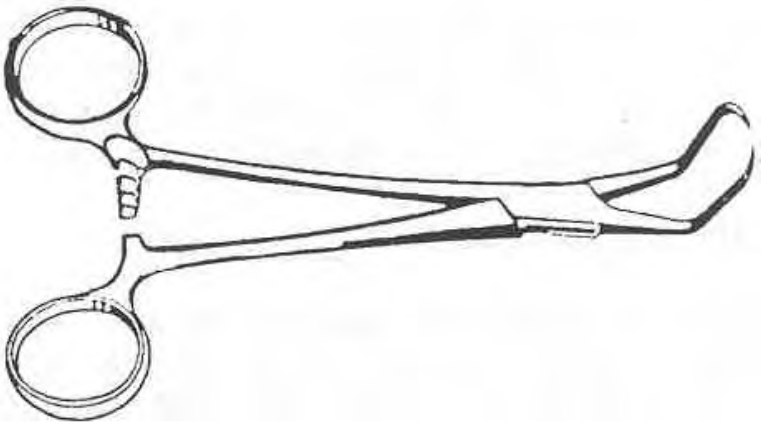


Figure 3-32. Towel clamp.

3-26. SURGICAL INSTRUMENT STAND (STAND, SURGICAL INSTRUMENT)

A surgical instrument stand is shown in figure 3-33.

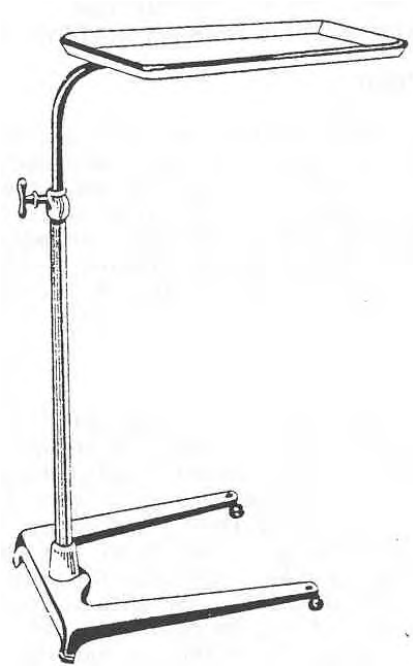


Figure 3-33. Surgical instrument stand.

Section III. INSTRUMENT SETUPS AND PROCEDURES

3-27. GENERAL

Procedures commonly used in the oral surgery section will be discussed in the following paragraphs of this lesson. Basic and local hospital operating room procedures are described in Field Manuel (FM) 8-73 and FM 8-74. See appendix A for the listing of the instruments in a typical surgical setup.

3-28. PREPARATION TO RECEIVE THE PATIENT

Preparation to receive a patient begins with the cleanup and sterilization of instruments used during the treatment of the preceding patient. All evidence of treatment of that patient should be removed. Traces of blood should be removed from the dental unit and instrument trays. The cuspidor, aspirator bottles, handles, tips, and tubes should be cleaned. Instruments should be scrubbed and either sterilized or set aside for sterilization. Linens, headrest covers, and bracket table covers should be replaced. The dental chair should be lowered and set in an upright position with the bracket table and operating lamp pushed back out of the way. The next patient's records and radiographs should be set out for the dental officer to examine. A basic examination setup (lesson 1) should be placed on the bracket table. Instrument setups, sterile towels, and dressings (as indicated by the dental officer) should be on hand and their need anticipated.

3-29. PREOPERATIVE TREATMENT

In some cases, the dental officer may wish the next patient to have some form of medication before surgery and may have the patient come in early for this purpose. The dental specialist may be expected to make a record of patients requiring such medication, notifying the dental officer of the patient's arrival, reminding him of the need for medication, and recording the medications given. The oral surgery assistant should be familiar with the uses, doses, and effects of these and other drugs important in the practice of oral surgery.

3-30. EXTRACTIONS

a. **General**. Extraction in oral surgery refers to the removal of teeth. That phase of oral surgery that deals with extractions is called exodontia. Teeth can frequently be removed simply through proper application of force using extraction forceps or elevators. Other teeth, because of the curvature of roots, the divergence of roots, excessive cementum (called hypercementosis), density of bone, or alignment of the teeth may be harder to extract. In these cases, the use of elevators, the removal of bone, the sectioning of teeth with burs or chisels, or combinations of these procedures may be necessary. Instruments and techniques used will vary with the tooth, with the presence of complicating conditions as described above, and with the techniques favored by the dental officer.

b. **Instrument Setups.**

(1) Uncomplicated extraction. See figure 3-34.

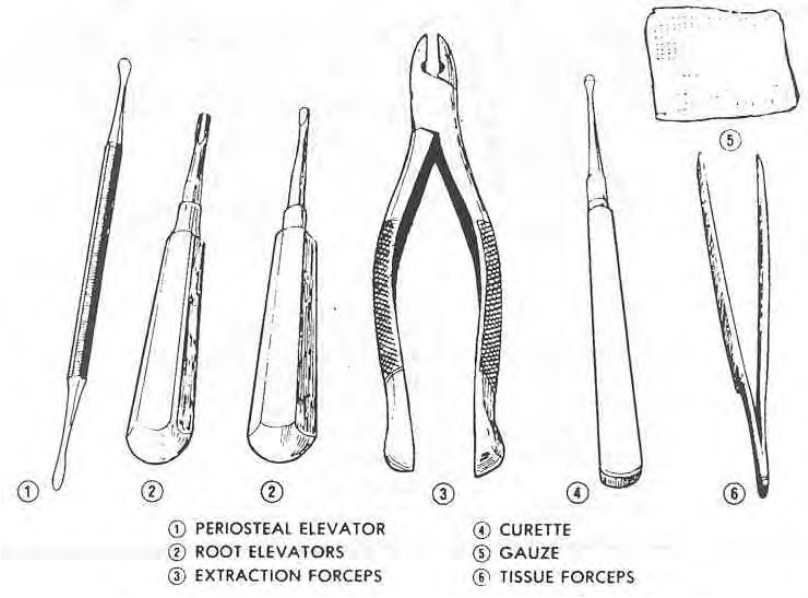


Figure 3-34. Instruments and materials for uncomplicated extraction.

(2) Surgical extraction and bone removal. See figure 3-35.

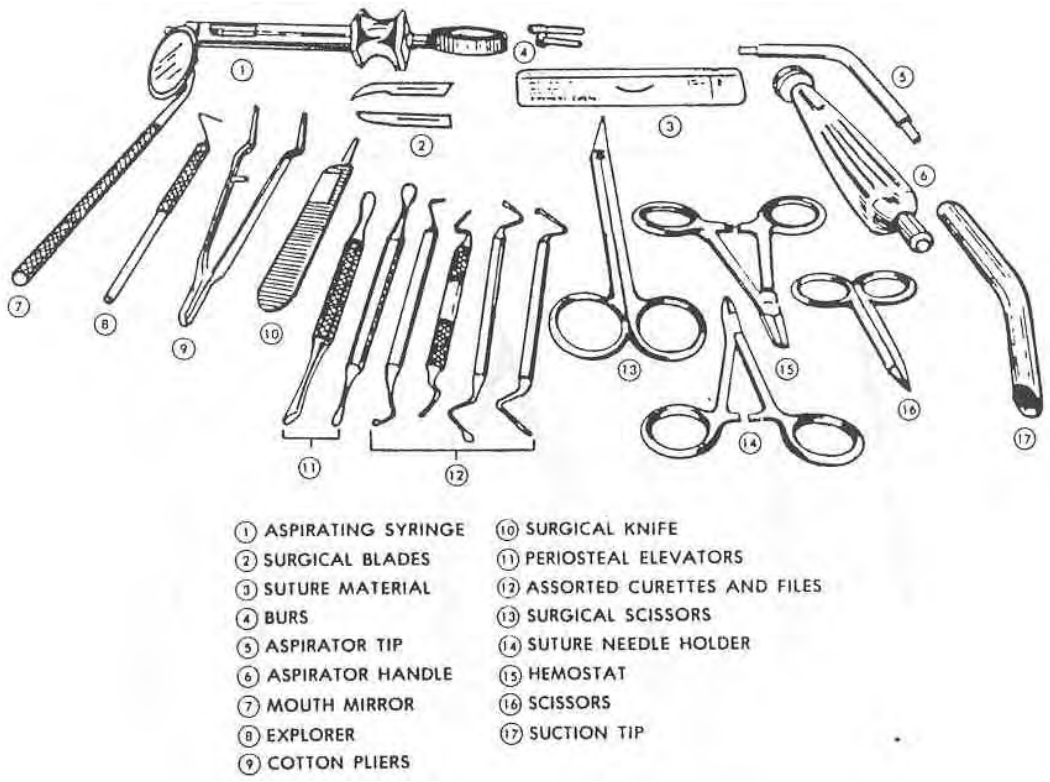


Figure 3-35. Instruments and materials for surgical extraction and bone removal.

3-31. REMOVAL OF IMPACTED TEETH

a. **General.** Impacted teeth are those that are so located and inclined within bone that they fail to erupt and cannot erupt normally. Impacted teeth may be completely embedded or partially erupted. Mandibular third molars (wisdom teeth) are the most commonly impacted teeth. Impaction of other teeth may occur, with the maxillary third molars and cuspids most frequently observed. Supernumerary teeth, retained roots, and foreign bodies embedded in the jaws present problems of location and removal similar to those encountered with impacted teeth. Surgical extraction involving bone removal is often necessary.

b. **Instrument Setup.** The instrument setup for the removal of impacted teeth is similar to that for surgical extraction and bone removal.

3-32. PREPARING INSTRUMENT SETUPS

A working knowledge of oral surgical procedures is a necessity for the dental specialist. The nature of the work done in oral surgery requires that everything that may be needed during an operation be available immediately. The dental officer will be at the chair-side with the patient; therefore, it is imperative that the specialist understands the operation and is able to recognize instruments in order to save time.

a. **Variation in Procedures.** Procedures followed in sterilizing, storing, and preparing instruments for oral surgery will depend upon the desires of the oral surgeon, the extent and volume of surgery done, and the facilities available, so far as they adhere to principles prescribed in FM 8-38. Some oral surgery services have sterilizing facilities adequate to handle all their needs; others must depend upon medical service sterilizing facilities for autoclaving. Some oral surgeons have complete sets of instruments and materials autoclaved in packs to meet the needs of each commonly performed surgical procedure. Some have the items sterilized and stored separately but have them assembled into sets before each operation. Others have just the minimum number of instruments set out and additional ones obtained as needed. In some oral surgery services, the sterile items are stored in cabinets. In others, they are stored on shelves or on tables covered with sterile drapes. In any case, aseptic procedures must be carefully followed to maintain sterility. Scrupulous cleanliness of the oral surgical suite is an absolute necessity to prevent any contamination.

b. **Steps of Procedure.** In arranging the surgical tray or other work areas, the first step is to drape the area with sterile (autoclaved) towels. The next step is to lay out the instruments and other materials in the order in which they are to be used. The final step is to cover the setup with a sterile towel until the dental officer is ready for its use.

3-33. ALVEOLECTOMY

a. **General**. Alveolectomy is the contouring of alveolar bone. It may be done to smooth the bone after removal of teeth or other surgery, to contour irregular ridges, to remove bone undercuts, or to increase the space between the maxillary and mandibular ridges before the fabrication of dentures.

b. **Instrument Setup**. See figure 3-36.

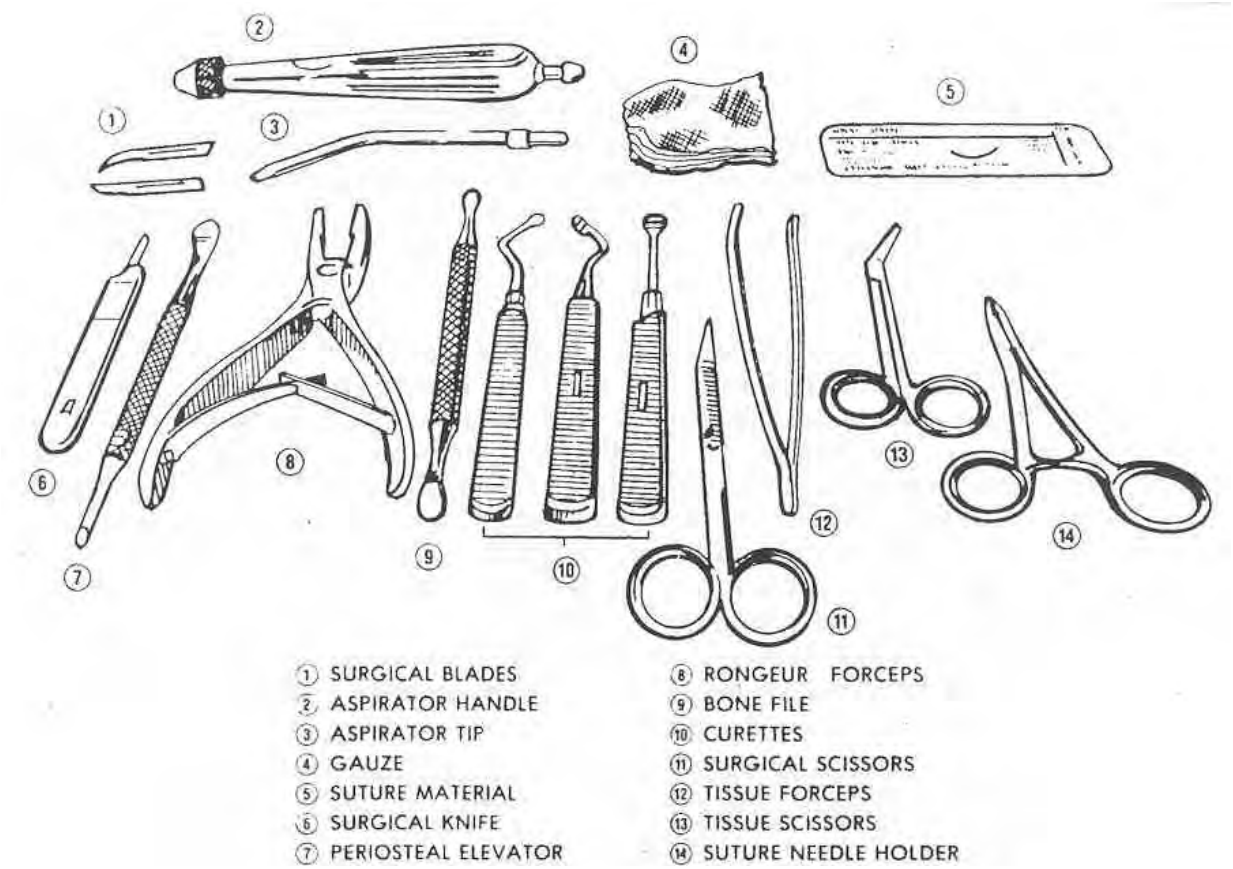


Figure 3-36. Instruments and materials for alveolectomy.

3-34. FRACTURES

a. **Treatment of Fractures.** Definitive treatment and care are normally performed by the oral surgery service of a hospital's department of dentistry. In treating any fractured bone, the objective is to bring the fragments of bone as near to their normal relationship as possible and to immobilize them in that position long enough for a bony union to occur and normal function to return. In most fractures of the jaw, proper apposition of the fragments can be achieved by restoring teeth to their normal occlusal relationship with teeth of the opposing jaw. Immobilization may be achieved by any of several methods. The most common method is to apply wires or special arch bars to the teeth in each jaw to provide hooks for the anchorage of small rubber bands. The rubber bands are stretched from hooks of one jaw to those of the other jaw in such a way as to maintain the correct occlusal relationship of the teeth by elastic traction. Some fractures are immobilized by metallic or acrylic splints made to fit over the teeth. Some are held in position by wires passed through the bone. Other fractures may require complex means of immobilization or even bone grafts or prosthetic restorations to correct defects.

b. **Postoperative Treatment.** Following fracture reduction, the postoperative treatment during the weeks of immobilization may consist of:

(1) Daily evaluation of the efficiency of the chosen method of immobilization.

(2) Irrigation of the patient's mouth to aid in oral hygiene.

(3) Instruction in methods of good oral hygiene and the use of a device that delivers a pulsating stream of water, if one is available.

(4) Instruction in the use of a child's toothbrush to aid in oral hygiene.

3-35. ASSISTING DURING SURGERY

a. **Operative Techniques**. One of the most helpful procedures performed by the dental specialist in oral surgery is the manipulation of the suction apparatus or the use of gauze sponges in such a way as to keep the surgical field free of blood, saliva, and tissue while interfering as little as possible with the view of the dental officer. To perform oral surgery properly, the surgeon must be able to see the tissue he is manipulating. Other ways in which the oral surgery assistant helps to afford good vision of the operative site is by keeping the operating lamp adjusted for maximum illumination, by wiping blood and other material from the mouth mirror as it accumulates, and by careful retraction of cheeks, lips, and other tissues. Efficiency of the operation is further enhanced by keeping the instrument tray in order, removing instruments and materials no longer needed, preparing other instruments and materials for use before needed, and being ready to take each instrument as the dentist finishes using it and to replace it with the one he will need next. The assistant must also learn how to use the surgical mallet. Proper malleting technique requires working with the dentist in a coordinated rhythmic pattern and knowing how much force to apply, at what angle the mallet must strike the chisel, and when to begin and when to discontinue malleting. During the placement of sutures, the assistant will be expected to help by cutting the suture material after each knot is tied.

b. **Caring for the Patient**. The oral surgery assistant should be ever mindful of the patient, seeing to his comfort and preventing accidental soiling of his clothes. During surgical procedures, the assistant should carefully observe the patient for signs of syncope (clammy or pale skin and lips) or apprehension and notify the dental officer of the change. When surgical procedures are prolonged, he can often lessen the patient's discomfort by supporting his head and mandible. When the operation is completed, the oral surgery assistant should remove blood and other traces of the operation from the patient's face and lips. Before the patient is dismissed, the assistant should be alert to remind the dental officer of needed postoperative instructions or medications and to reemphasize the dental officer's instructions to the patient.

3-36. POSTOPERATIVE CARE OF THE PATIENT

a. **Dismissing the Patient.** The patient should not be dismissed until blood or any other evidence of the operation has been removed from his face or lips. He should receive the necessary postoperative instructions and medications and future appointments, if needed. If he has been given medication that leaves him with incomplete control of his faculties, someone should escort him to his quarters. This should be arranged beforehand. The dental officer may want to detain the patient in the clinic for observation or recovery.

b. **Suture Removal.** Following surgery, the patient will be instructed in home care. Generally, he is instructed not to rinse on the day of surgery in order to avoid disturbing the clot. The following day, he should rinse gently with warm salt water to promote healing. He will receive exact instructions concerning any medication that he is to use. Another appointment is given at least 48 hours later for the removal of sutures. Other special instructions may be given as well, and he must always receive instructions to return to the clinic as soon as possible if any complications develop. The specialist should observe the patient postoperatively until all instructions have been given to the patient and he has left the clinic. Many dentists will ask dental specialists to remove sutures. See figure 3-37 for steps of suture removal.

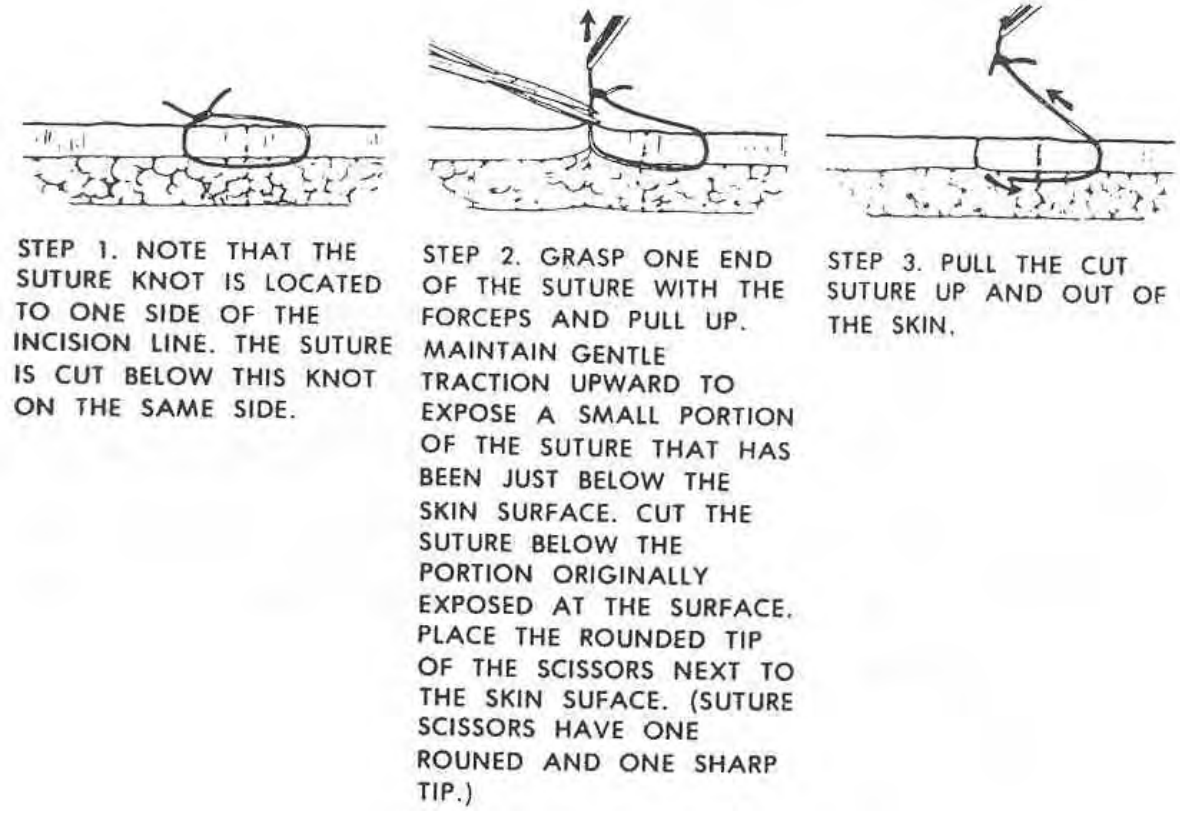

STEP 1. NOTE THAT THE SUTURE KNOT IS LOCATED TO ONE SIDE OF THE INCISION LINE. THE SUTURE IS CUT BELOW THIS KNOT ON THE SAME SIDE.
STEP 2. GRASP ONE END OF THE SUTURE WITH THE FORCEPS AND PULL UP. MAINTAIN GENTLE TRACTION UPWARD TO EXPOSE A SMALL PORTION OF THE SUTURE THAT HAS BEEN JUST BELOW THE SKIN SURFACE. CUT THE SUTURE BELOW THE PORTION ORIGINALLY EXPOSED AT THE SURFACE. PLACE THE ROUNDED TIP OF THE SCISSORS NEXT TO THE SKIN SUFACE. (SUTURE SCISSORS HAVE ONE ROUNED AND ONE SHARP TIP.)
STEP 3. PULL THE CUT SUTURE UP AND OUT OF THE SKIN.

Figure 3-37. Suture removal.

Continue with Exercises

EXERCISES, LESSON 3

INSTRUCTIONS. The following exercises are to be answered by marking the lettered response that best answers the question or best completes the sentence or by following the special instructions.

After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers with the solutions.

1. Extraction forceps vary because of differences in root shape, alignment of the tooth, and location in the mouth. The different types of forceps can be distinguished by each of the following characteristics EXCEPT:

   a. Angles of the beaks.

   b. Length.

   c. Notches on the beaks.

   d. Contour.

SPECIAL INSTRUCTIONS: For exercises 2 through 8, match the forceps numbers in column A with the forceps types in column B. Items in column B may be used more than once. Items in column A may have more than one answer.

COLUMN A	COLUMN B
___ 2. Forceps #65.	a. Maxillary anterior forceps.
___ 3. Forceps #222.	b. Maxillary posterior forceps.
___ 4. Forceps #53R.	c. Mandibular anterior forceps.
___ 5. Forceps #203.	d. Mandibular posterior forceps.
___ 6. Forceps #210.	
___ 7. Forceps #15.	
___ 8. Forceps #151S.	

9. In oral surgery, the dental specialist:

   a. Autoclaves instruments in advance.

   b. Transfers instruments by sterile instrument forceps.

   c. Assists in treatment of injuries or defects of the jaws.

   d. Performs "a" and "b" above.

   e. Performs "a", "b", and "c" above.

SPECIAL INSTRUCTIONS: For exercises 10 through 19, match the characteristics of the surgical instrument in column A with the appropriate surgical instrument in column B. Items in column B may be used more than once.

COLUMN A	COLUMN B
___ 10. Used to cut and contour bone.	a. Root elevators.
___ 11. Used to remove extraneous material from tooth sockets.	b. Periosteal elevators.
___ 12. Used to smooth the edges of bone.	c. Alveolar curettes.
___ 13. Seldin Elevator No. 22.	d. Rongeur forceps.
___ 14. May be used with a hand mallet.	e. Bone files.
___ 15. Used to loosen or remove roots or root fragments.	f. Bone chisels.
___ 16. Used to groove teeth for controlled sectioning.	g. Surgical burs.
___ 17. Used to separate and raise periosteum from the surface of the bone.	h. Surgical knives.
___ 18. Used to cut soft tissue.	
___ 19. Straight Elevator number 34S.	

20. Which instrument setup is the same as the setup for the removal of an impacted tooth?

    a. Basic examination.

    b. Uncomplicated extraction.

    c. Surgical extraction and bone removal.

    d. Alveolectomy.

21. Which of the following is the most common method of immobilizing the jaw in treating a fracture?

    a. Passing wires through the bone.

    b. Using bone grafts and prosthetic restorations.

    c. Using metallic or acrylic splints to fit over the teeth.

    d. Stretching rubber bands from hooks of one jaw to those of another jaw.

22. According to the text, during oral surgery, the dental specialist will be called upon to perform all of the following tasks EXCEPT:

    a. Manipulating the suction apparatus.

    b. Using a surgical mallet with proper technique.

    c. Removing sutures.

    d. Keeping the surgical field free of blood.

    e. Placing sutures.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 3

1. b (para 3-5a)
2. a (para 3-5b(1)))
3. d (para 3-5e(3))
4. b (para 3-5c(2))
5. c, d (paras 3-5d(2), e(1))
6. b (para 3-5c(3))
7. d (para 3-5e(2))
8. c, d (paras 3-5d(1), e(1))
9. e (paras 3-2, 3-32a, 3-34)
10. d (para 3-9)
11. c (para 3-8)
12. e (para 3-10)
13. b (para 3-7d)
14. f (para 3-11)
15. a (para 3-6)
16. g (para 3-13)
17. b (para 3-7)
18. h (para 3-15)
19. a (para 3-6b)
20. c (para 3-31b)
21. d (para 3-34a)
22. e (paras 3-35a, 3-36b)

End of Lesson 3

LESSON ASSIGNMENT

LESSON 4	Periodontic and Endodontic Instruments.
LESSON ASSIGNMENT	Paragraphs 4-1 through 4-12.
LESSON OBJECTIVES	After completing this lesson, you should be able to:

4-1. Define the meaning of periodontics.

4-2. Identify the instruments used in periodontics procedures.

4-3. Name the actions that the dental specialist should take to prepare the patient for periodontic procedures.

4-4. Define the meaning of gingivectomy.

4-5. State common periodontal duties.

4-6. Define the meaning of endodontics.

4-7. Identify the skills required by the dental specialist while assisting the dental officer during an endodontics treatment.

4-8. Name the three basic phases in endodontic treatment.

4-9. Identify the instruments used in endodontic treatment.

4-10. Identify the procedures used in preparing the patient for endodontic treatment.

4-11. List the sequence of treatment for the single appointment method for a root canal.

4-12. Identify the procedures for administering apicoectomy therapy.

4-13. Identify the skills required for the care and cleaning of instruments.

SUGGESTION After studying the assignment, complete the exercises at the end of this lesson.

LESSON 4

PERIODONTIC, ENDODONTIC, AND PROSTHODONTIC INSTRUMENTS

Section I. PERIODONTIC INSTRUMENTS

4-1. INTRODUCTION

a. **Periodontics.** Periodontics is the specialty of dentistry providing prevention, diagnosis, and treatment of diseases and abnormalities involving the tissue structures that surround and support the teeth. These structures are the periodontal ligament, gingiva, cementum, and alveolar bone. The signs and symptoms of periodontal disease are loose teeth, sensitivity to pressure, enlarged gingival tissues, bleeding gingival tissues when using a toothbrush, and halitosis (bad breath). Periodontal disease often begins as gingival inflammation in children and young adults. Without early recognition of the disease and early adequate treatment, the disease progresses to an advanced disease status with little inconvenience or pain to the patient. In the advanced status, the teeth become sore to pressure, are demonstrably loose, and develop painful conditions such as acute periodontitis and periodontal abscess. After the age of 35, periodontal disease is the major cause for the loss of natural teeth. Thus, it is a major dental problem developing from a lack of early recognition and treatment.

b. **The Dental Specialist as an Assistant in Periodontics.** General clinical duties apply to the dental specialist assigned to the periodontic service. In addition, depending on the ability of the dental specialist and the techniques and treatment procedures of the dental officer, the dental specialist will be used as a special surgical procedure assistant and oral hygiene technician and in other activities peculiar to periodontics. The dental specialist will be expected to do scaling, root planing, dental plaque control, occlusal adjustment, and basic examination. The general background, basis for prevention, and treatment in periodontics differ from most other types of dental treatment in that there is less mechanical technique and more emphasis on restoring function and preserving viable tissues that are part of the whole living system of the human body.

4-2. INSTRUMENTS

a. **General.** Instruments used in the treatment of periodontal diseases are designed for one or more of the following objectives: determining soft tissue pocket depth; surgically incising and removing soft tissue to eliminate soft tissue pockets; removing calculus and debris from roots of teeth; removing soft tissue from periodontal pockets; and removing, reshaping, or contouring hard structure (alveolar bone). Other instruments (such as scalpels, needle holders, hemostats, and suture needles) used in oral surgery are employed routinely in periodontal surgical procedures. Medical Supply Catalog nomenclature is included in capital letters following the name ordinarily used to designate each instrument.

b. **Periodontal Scaler (SCALER, PERIODONTAL).** A periodontal scaler (figure 4-1) is used to remove calculus and stain from the clinical crown of the tooth. The scaler has pointed blades along each side and is used with a pull stroke. The scaler may either be single-ended or double- ended. Some examples of periodontal scalers are the McCall 13-14S and 17-18S, Younger-Good 7/8, Orban straight sickle 14, Crane-Kaplan 6, Towner U-15, Kirkland 13K/13KL, and Pritchard.

Figure 4-1. Periodontal scaler.

c. **Periodontal Curette (CURETTE, PERIODONTAL).** A periodontal curette (figure 4-2) is used to remove calculus, smooth root surfaces, and the soft tissue wall of the pocket. A curette is used with a pull stroke. The blades must be sharp to be of any value. Examples of periodontal curettes are the Gracey curettes (1 through 14) with flexible shanks. Separate sets for curettage and root planing are usually available.

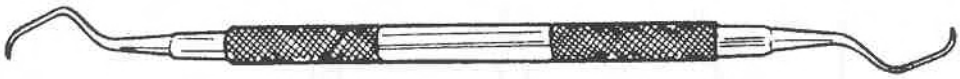


Figure 4-2. Periodontal curette.

d. **Periodontal Hoe (HOE, PERIODONTAL).** The periodontal hoe (figure 4-3) is used to remove gross amounts of supragingival calculus and some subgingival calculus in large wide-open pockets where gingival tissues are soft and very easily cleaned. The periodontal hoe is used with a pull stroke. Some examples of periodontal hoes are the Orban 6/7 and 8/9 and Kirkland 14.

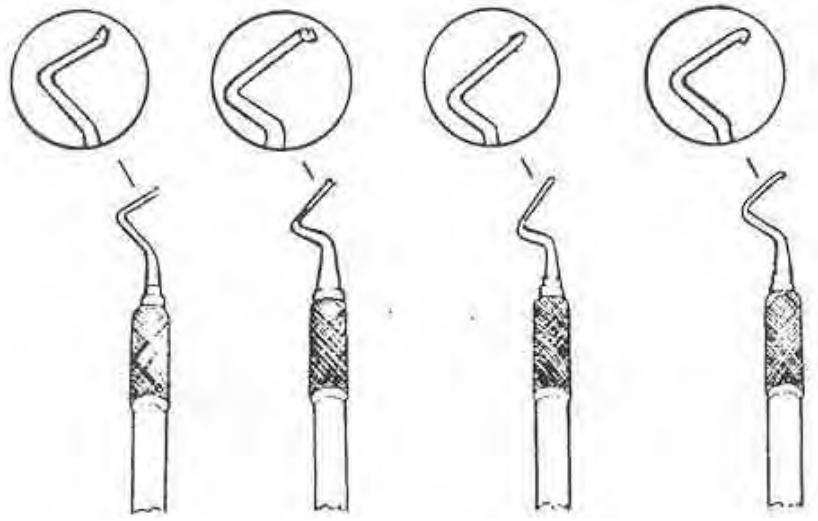


Figure 4-3. Periodontal hoes.

e. **Periodontal File (FILE, PERIODONTAL).** A periodontal file (figure 4-4) is used to remove gross supragingival calculus, smooth the cementoenamel junction, and remove overhanging margins of dental restorations. Files are a series of fine short blades or hoes at an angle to the shank and are quite difficult to sharpen. A pulling stroke is used to activate the periodontal file. Some examples of periodontal files are the Orban 10, 11, 12, and 13 and the Sugarman 15/25 and 35/45.

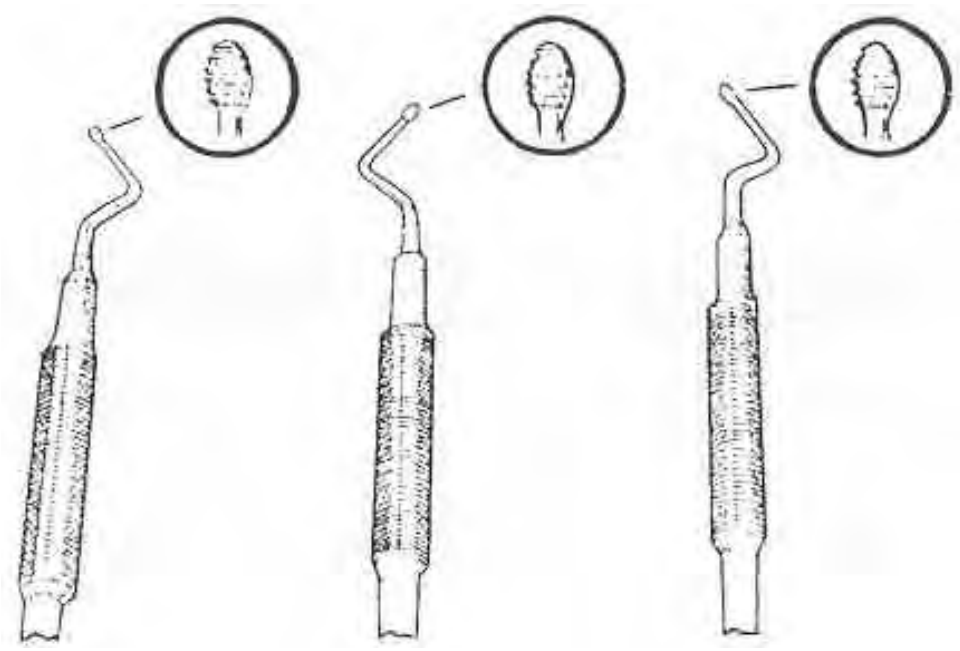


Figure 4-4. Periodontal files.

f. **Periodontal Pocket Marker (FORCEPS, PERIODONTAL POCKET MARKING).** A periodontal pocket marker (figure 4-5) is used to determine the depth of soft tissue pockets and the contour of the bone resorption about a tooth. While the area is anesthetized, a bleeding point is created for easy identification by the dental officer. The surgical knife is placed at the bleeding point and the tissue coronal to that point is excised and removed. This procedure is called a gingivectomy. An example of a periodontal pocket marker is the Goldman-Fox number two.

Figure 4-5. Periodontal pocket marker.

g. **Periodontal Probe (PROBE, PERIODONTAL).** A periodontal probe (figure 4-6) is used to locate and measure the depth of a gingival crevice or periodontal pocket. The probe is also used to measure the loss of attachment of the tooth. A probe is round or flat and marked in millimeters on the side. A probe is color coded for easy identification. Some examples of periodontal probes are the Goldman-Fox (flat), Nabers (flat), Glickman (round), Michigan O (round), and Williams (round).

Figure 4-6. Periodontal probe.

h. **Chisel (CHISEL, DENTAL).** A chisel (figure 4-7) is used to remove heavy supragingival calculus from the proximal surfaces of anterior teeth when the embrasure spaces are open. A push horizontal stroke from facial to lingual is used to dislodge the calculus on the proximal surfaces. The Ochsenbein 1, 2, TG, and TGO and Chandler bone chisel C1, C4, and C7 are some examples of chisels.

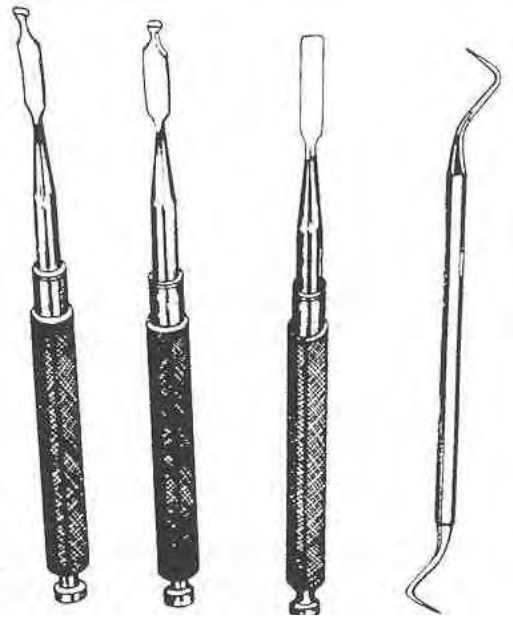


Figure 4-7. Chisels.

i. **Periodontal Knife (KNIFE, PERIODONTAL).** A periodontal knife is used to incise gingival tissues. The knife must be sharp to function properly and must not be allowed to touch other instruments or be dropped on a hard surface (floor, sink, and so forth). The knife must be sharpened after each surgical procedure and before sterilization. To prevent accidents, special care must be taken when preparing and wrapping the knife for sterilization.

(1) Kirkland knife 15/16. This knife (see figure 4-8, top portion) is a single-ended or double-ended knife used for initial gingivectomy incision, tuberosity and retromolar pad reduction, and free gingival grafts preparation.

(2) Orban knife 1/2. This knife (see figure 4-8, bottom portion) is a single-ended or double-ended knife used for interproximal tissue incisions, interproximal tissue removal, and free gingival grafts.

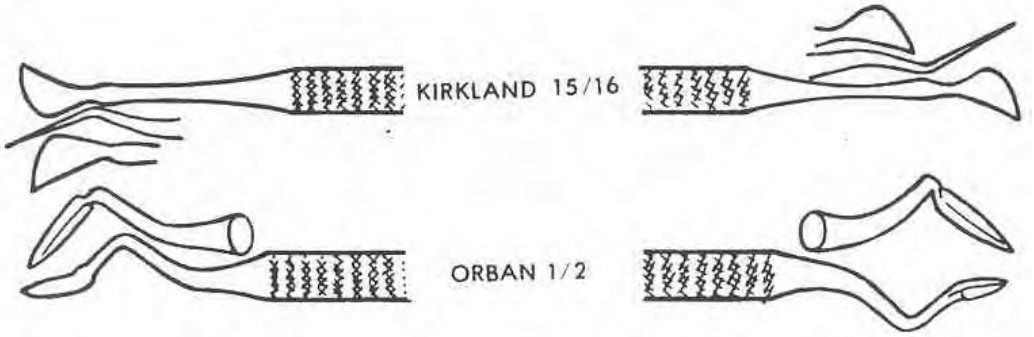


Figure 4-8. Kirkland and Orban knives.

(3) Scalpel. Blades 12, 12B, and 15 (see figure 4-9) are used in every periodontal surgical procedure from free gingival grafts to the inverse bevel incision on a full thickness apically repositioned flap. The blades 12 and 15 are single-edged. The blade 12B is a double-edged blade used to cut in a push and pull motion. The blades are disposable and available in presterilized packages.

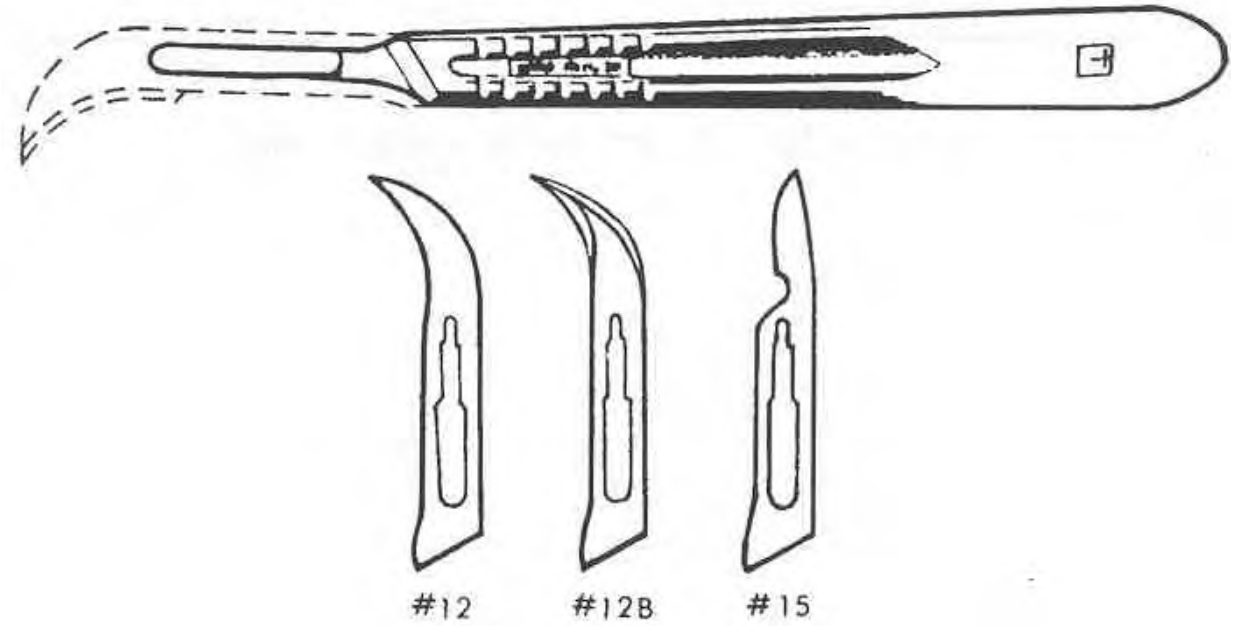


Figure 4-9. Blade handle and blades.

i. **Ultrasonic Dental Unit (ULTRASONIC PROPHYLAXIS UNIT, DENTAL).** The ultrasonic unit with insert tips (see figure 4-10) is used to remove supragingival and subginginval calculus, stains, amalgam overhangs, and soft tissue pocket wall (curettage). Operating at 25,000 cycles per second, energy is transferred to the calculus, stain, amalgam overhang, or tissue, causing separation from the tooth surface. Operator fatigue is greatly reduced and productivity is increased with the use of an ultrasonic unit. A high-speed evacuator is necessary to keep the bacteria-containing aerosol mist from the air in the operatory. Hand scaling, however, is still the preferred method for root planing. There are two types of ultrasonic units. One type of unit has its own water supply and instrument box. A second type of unit resembles a handpiece and operates using the high-speed handpiece hose.

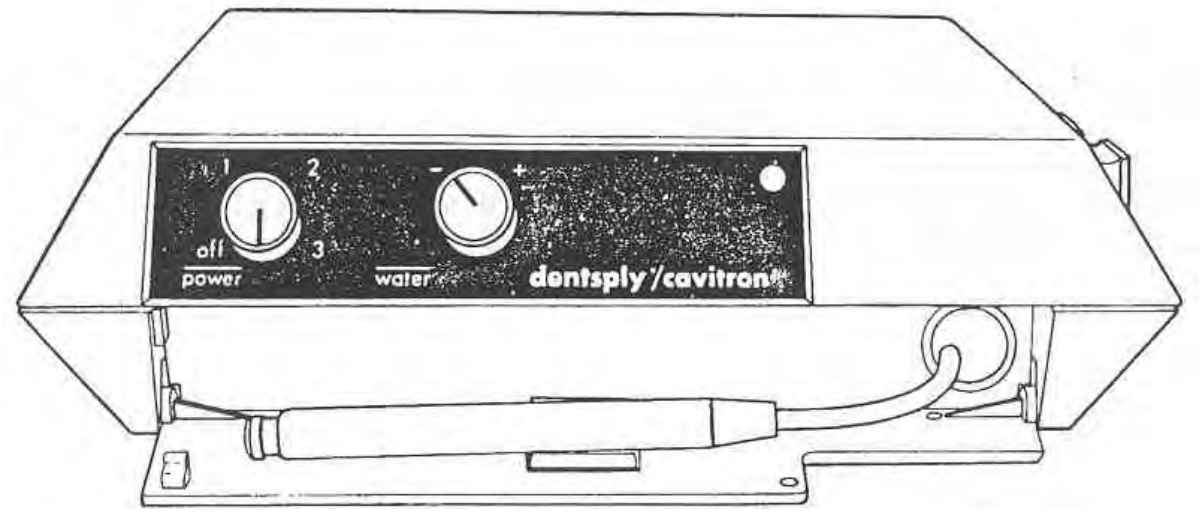
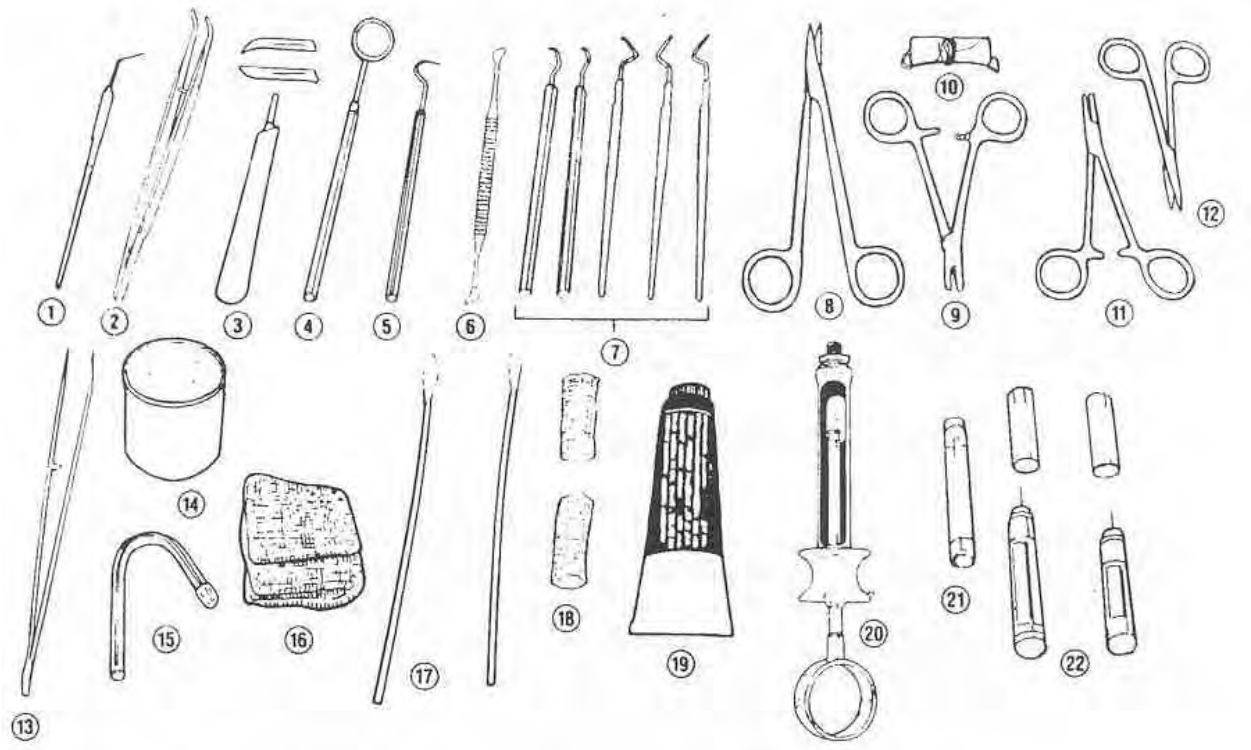


Figure 4-10. Ultrasonic dental unit.

4-3. INSTRUMENT SETUPS AND SURGICAL PROCEDURES

a. **General.** Most of the procedures performed in periodontal surgery have a setup similar to restorative dentistry. In addition, depending on the training of the dental specialist and the techniques and treatment procedures of the dental officer, the dental specialist may perform as a special surgical assistant, dental hygienist, or oral health manager. The treatment in periodontics varies somewhat from restorative dentistry in that there is more emphasis on oral medicine, surgical therapy, prevention, and long-term maintenance care. See figure 4-11 for the basic periodontal instrument setup.

NOTE: As an example of a periodontal surgical procedure, we will discuss the role of the dental specialist in a gingivectomy. A gingivectomy is a procedure that is fairly well-known among the general public. It is discussed in paragraph "c" below.



① PERIODONTAL PROBE
② PERIODONTAL POCKET MARKER
③ SURGICAL KNIFE HANDLE AND BLADES
④ MOUTH MIRROR
⑤ EXPLORER
⑥ PERIODONTAL KNIFE
⑦ PERIODONTAL SCALERS AND FILES
⑧ SURGICAL SCISSORS
⑨ SUTURE NEEDLE HOLDER
⑩ SUTURE NEEDLE AND SUTURE MATERIAL
⑪ HEMOSTAT
⑫ SUTURE SCISSORS
⑬ COTTON PLIERS
⑭ COTTON BALL DISPENSER
⑮ SALIVA EJECTOR
⑯ GAUZE
⑰ COTTON-TIP APPLICATORS
⑱ COTTON ROLLS
⑲ TOPICAL ANESTHETIC MATERIAL
⑳ ASPIRATING SYRINGE
㉑ CARTRIDGE OF ANESTHETIC SOLUTION
㉒ DISPOSABLE NEEDLES

Figure 4-11. Basic periodontal surgical tray setup.

b. **Preparation to Receive the Patient.** Preparation to receive a patient begins with the cleanup and sterilization of instruments and materials used during the treatment of the previous patient. Following the dismissal of the previous patient, all evidence of treatment of that patient should be removed. Used instruments should not be allowed to accumulate. They should be cleaned, sharpened as needed, sterilized, and returned to storage as time permits during and between appointments. Linens, bracket table covers, and headrest covers should be replaced. The patient's records and radiographs should be set out for the dental officer's reference. Instruments and materials set up for local anesthesia and the planned periodontal procedures should be placed on the bracket table and covered with a sterile drape.

c. **Gingivectomy.**

(1) General. Gingivectomy, in its simple form, involves the surgical incision and removal of the soft tissues forming periodontal pockets about the teeth. The gingival tissue is removed to restore an environment that can be maintained in a healthy condition by the patient and to prevent further disease in the tissues supporting the teeth. After the soft tissue is removed, the exposed areas are thoroughly scaled and curetted while visibility is greatest.

(2) Instruments and materials. The usual setup of instruments and materials (previously autoclaved) for a gingivectomy includes a mirror and the items shown in figure 4-11. Other items may be requested as desired by the dental officer. A periodontal dressing, which is used as a bandage and controller of hemorrhage, is placed over the areas where the gingivectomy has been performed.

(3) Duties of the dental specialist.

(a) The dental specialist should be at the chair at all times when a patient is present, especially when surgery is in progress. He should aid the periodontist in keeping the patient comfortable, help to maintain visibility in the operating field, have the required instruments available, and anticipate the periodontist's need. The dental specialist should know how much and to what consistency the periodontal protective paste should be mixed to form the periodontal pack or dressing for the periodontal surgery. There is a tube of base, and a tube of accelerator, and a bottle of retarder, which have to be mixed. This is usually prepared immediately before use. After the dressing is put in place, ice water is applied to it to help harden the material. The sooner it hardens, the less likely it is to be displaced by movement of the patient's tongue. Figure 4-12 shows the materials used to mix a periodontal dressing, sometimes called a periodontal pack. The most common commercial periodontal dressing is the Coe-Pak.

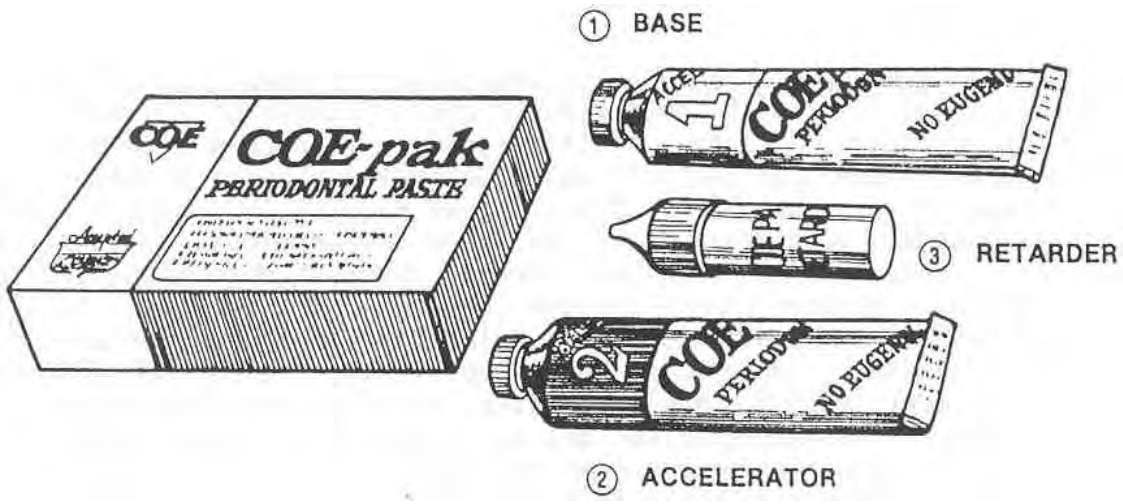


Figure 4-12. Materials for mixing a periodontal dressing.

(b) At the conclusion of the gingivectomy, the dental specialist should be certain the patient has been given postoperative instructions, medication or prescriptions, and a reappointment. The dental specialist should observe the patient to be certain that he can take care of himself, that the patient's clothes are arranged properly, and that the patient's face is free of blood or other foreign material. The dental specialist will inform the periodontist if any discrepancies exist.

(c) After dismissal of the patient, the instruments and suction hose and tips should be soaked in a cool detergent solution for 10 minutes before scrubbing, rinsing, and preparing for packaging and autoclaving.

4-4. COMMON PERIODONTAL DUTIES

a. **Oral Hygiene Instructions**. Among other procedures to be performed by the periodontic service are instructions to the patient on the proper maintenance of his mouth (dental plaque control). This important phase of periodontal treatment often can be referred to the dental specialist assisting the periodontist, when the specialist is properly trained.

b. **Emergency Treatments**. Emergency treatments for incision and drainage of periodontal abscesses, acute gingivitis, stomatitis and other causes of pain will be a part of the activities of a routine day. For treating these emergencies, each periodontist chooses the instruments and methods, all aimed at relieving the emergency situation and then instituting definitive treatment.

Section II. ENDODONTIC INSTRUMENTS

4-5. GENERAL

a. **Endodontics.**

(1) Two types of endodontic treatment. Endodontics is that branch of dentistry which deals with the diagnosis and treatment of diseases of the pulp and the periapical tissues. A vital tooth is furnished with both a blood and nerve supply. When the tooth is deprived of its blood and nerve supply through trauma or infection, it is diseased and requires endodontic treatment. Endodontic treatment or therapy is of two types--nonsurgical (also called conservative) and surgical. Conservative endodontic therapy involves obturating the root canal or canals by gaining access through the crown of the tooth. It also encompasses pulp capping, pulpotomy, and pulpectomy in connection with restorative treatment. (Obturating refers to filling the entire root canal completely and densely with a non-irritating, air-tight sealing agent.) Surgical endodontic therapy involves gaining access to the root canals by removing the bone about the root end of the tooth. Sometimes a portion of the root end is removed and prepared to accept an amalgam filling.

(2) The infection process. When the pulp of a tooth is damaged beyond repair, it deteriorates. Tissues of the pulp break down and the pulp chamber and canals become a source of infection, harboring pathogenic bacteria. These breakdown products cause a deterioration of the healthy tissue about the root end or apex of the tooth. Apical infection (tooth root infection) not only destroys this healthy tissue, but can impair the patient's health. Before the advent of endodontics, the treatment for this condition was extraction. The loss of a tooth can cause changes in the masticatory function of the teeth and mental anguish to the patient. Replacement of the tooth often requires extensive procedures. Sometimes, replacement is not feasible. Therefore, as long as supporting structures of the teeth are healthy, endodontics may be indicated to preserve the dentition in its most nearly natural form.

b. **The Role of the Dental Specialist in Endodontics.** In addition to general clinical duties, the dental specialist assigned as an assistant in endodontics will be expected to become familiar with the techniques, materials, and instruments used by the dental officer.

(1) Constant awareness of need for asepsis. Most important, the dental specialist must always be aware of the need for cleanliness, disinfection, and proper sterilization. One contaminated instrument can lead to endodontic failure. Personal hygiene and tidy appearance are most reassuring to all concerned.

(2) Patient care technique. The dental specialist also should make a special effort to be extremely tactful with patients. For example, patients automatically associate the nerve of a tooth with pain. Reassuring gestures and attitude are helpful in gaining the patient's confidence.

(3) Proficiency in using x-rays. Endodontics requires the dental specialist to be familiar with basic radiographic techniques, effects of radiation, and protection of the patient by the use of a lead apron. He should review techniques for developing radiographs as he will often be required to develop them for the endodontist.

(4) Proficiency with tooth numbering system. He should be aware of the tooth numbering system and nomenclature used in the armed services because he will be required to transcribe the information gained from each appointment to the patient's record. This is especially important when a tooth with several root canals is involved. If any doubtful situation arises, the dental specialist should always consult the dental officer.

(5) Flexibility. Each dental officer uses the techniques of instrumentation and the particular methods that work best for him. The endodontic assistant should be flexible enough to adjust to different techniques.

c. **Techniques of Root Canal Therapy**. There are three basic phases in endodontic treatment. First is the diagnostic phase in which the disease to be treated is determined and the treatment plan developed. The second is the preparatory phase, when the contents of the root canal are removed and the canal prepared for the filling material. The third involves the filling or obliteration of the canal to gain a hermetic (airtight) seal as close as possible to the cementodentinal junction with an inert material. The dental specialist plays a key role in the successful completion of all three phases by having the necessary equipment ready at the appropriate time.

(1) Diagnosing. All root canal therapy begins with a diagnosis. First, the dental officer takes an oral history of the patient's particular problem. The assistant should enter the patient's chief complaint (abbreviated C.C.) on the record. The chief complaint should be written in the patient's own words. Next, a clinical examination should be performed. The assistant should provide the basic examination setup for dental officer. When the offending tooth or area is located, a periapical radiograph is taken to aid in the diagnosis. Frequently, a radiograph will not reveal any definite pathology. In this case, the assistant should be prepared to provide the dental officer with auxiliary diagnostic aids. The electric pulp tester (figure 4-13) and warm and cold thermal tests are the most commonly used auxiliary diagnostic aids.

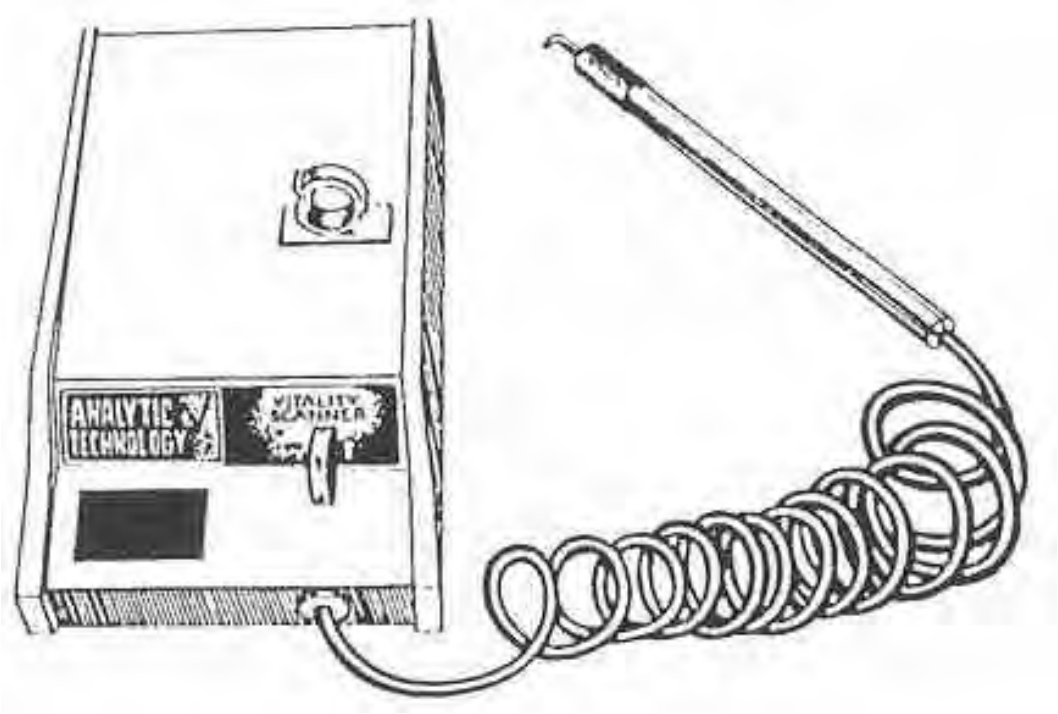


Figure 4-13. Electric pulp-tester.

(2) Preparing the canal. Once the diagnosis is made, local anesthesia may be administered by the dental officer. The rubber dam is applied and the area of the rubber dam around the affected tooth is swabbed with an iodophor or alcohol disinfectant. The dental officer uses a high-speed handpiece to create an occlusal or lingual opening into the pulp chamber of the tooth. The slow-speed handpiece may be used to refine the shape and size of the opening. Next, a barbed broach may be used to remove the pulp tissue. At this point, a small file fitted with a rubber stop (figure 4-14) is placed in the root canal and the dental specialist takes a periapical radiograph of the tooth containing the stoppered file. This is referred to as the trial-file radiograph and is used to determine the correct working length of the files used. Once the working length is determined by the dental officer, all files used will be measured with the endodontic ruler and stoppered at the correct working length. The working length, expressed in millimeters, should be recorded in the patient's treatment record. Using reamers and files of increasing size stoppered to the correct working length, the root canal can be gradually shaped and enlarged. During the filing, the canal is irrigated to provide lubrication and a flushing action on the debris. Sodium hypochlorite (5 percent solution) is usually the irrigant used, and is administered with a large plastic syringe. When filing is completed, small paper points are used to dry the root canal.

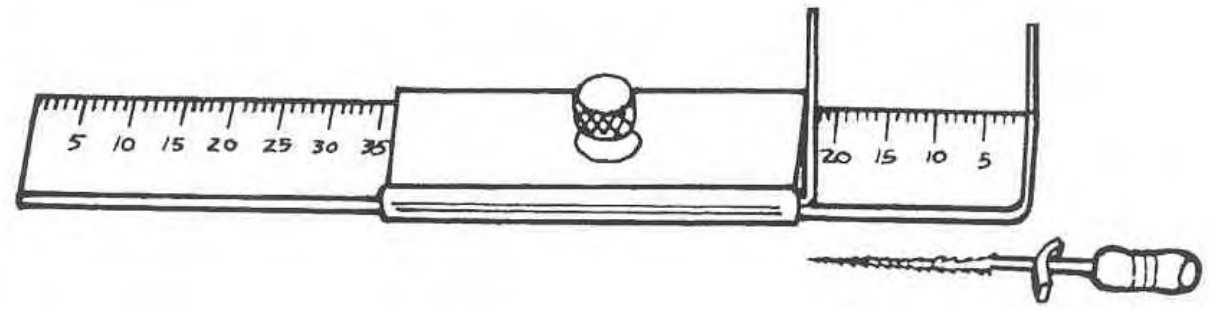


Figure 4-14. Endodontic ruler and file with rubber stop.

(3) Filling and sealing the canal. When the dental officer has determined that the root canal is sufficiently enlarged, he will select and trial-fit a gutta-percha point or silver point of the same size as the last file used. Once the point passes the trial fit, it is ready to be cemented. The dental specialist mixes the root canal cement or prepares a mix of zinc oxide and eugenol that can be drawn up from the mixing slab about 1 inch without separating. The point is coated with the cement and seated into place. Depending on the technique, a plugger or a spreader, or both, is used to condense the gutta-percha in the root canal. When the root canal has been filled satisfactorily, a thick mix of zinc oxide and eugenol or zinc phosphate cement is made and plugged into the access area to completely seal the canal. Completion of the endodontic treatment may not be accomplished in a single appointment. Therefore, medicament may be placed inside the pulp chamber or canals in a cotton pellet or paper point. The access opening is then sealed with an interim restorative material such as IRM.

4-6. RESPONSIBILITY OF THE DENTAL SPECIALIST

The practice of modern endodontics has made a great contribution to dentistry by reducing the number of teeth extracted. Figure 4-15 lists the steps in endodontic therapy. The dental specialist is expected to understand the basic principles of endodontics and to be familiar enough with the procedures to effectively assist the dental officer.

PROCEDURE	DONE BY: Dental Officer	DONE BY: Dental Specialist	COMMENTS
Treatment room, equipment, and instruments sterilized and disinfected; patient seated.		x	See Chapter 6.
Patient's record, radiographs, and exam setup provided.		x	
Oral history taken and clinical exam performed.	x		
Auxiliary diagnostic aids provided.		x	If requested by the dental officer.
Auxiliary diagnostic tests.	x		If needed.
Periapical radiograph.		x	If requested.
Anesthetic setup provided.		x	Sometimes anesthesia is not necessary.
Anesthesia administered.	x		
Rubber dam application.	x	x	
Access to pulp chamber with high speed.	x		Use of air-water spray requires suction.
Provide broach in appropriate size.		x	
Pulp extirpation.	x		
Trial radiograph.		x	Radiograph must show undistorted root apices.
Working length calculated.	x		
Provide irrigant in plastic syringe.		x	
Canal irrigated.	x		
Provide reamers and files in increasing size, stoppered at the working length.		x	
Root canal filed.	x		
Provide paper points in appropriate sizes.		x	
Dry canal with paper points.	x		
Provide medicated paper points or cotton pellet.*		x	*If endodontic therapy is to be completed at another appointment.
Mix IRM.*		x	
Place IRM.*	x		
Provide gutta-percha or silver points.		x	
Trial fit the point.	x		
Trial radiograph with point in place.		x	This step is often omitted.
Mix root canal cement.		x	
Cementation of point.	x		
Mix IRM or $ZnPo_4$ cement.		x	
Seal access opening.	x		
Final radiograph.		x	If requested.

Figure 4-15. Steps in endodontic therapy.

4-7. INSTRUMENTS

a. **General.** Instruments specialized for use in root canal therapy are listed in the following paragraphs. The Medical Supply Catalog nomenclature is included in capital letters in parentheses following the common name.

b. **Root Canal Broach (BROACH, PULP CANAL).** Root canal broaches (figure 4-16) are used to remove (extirpate) the pulp from the root canal. They are available in three sizes--coarse, fine, and extra fine.

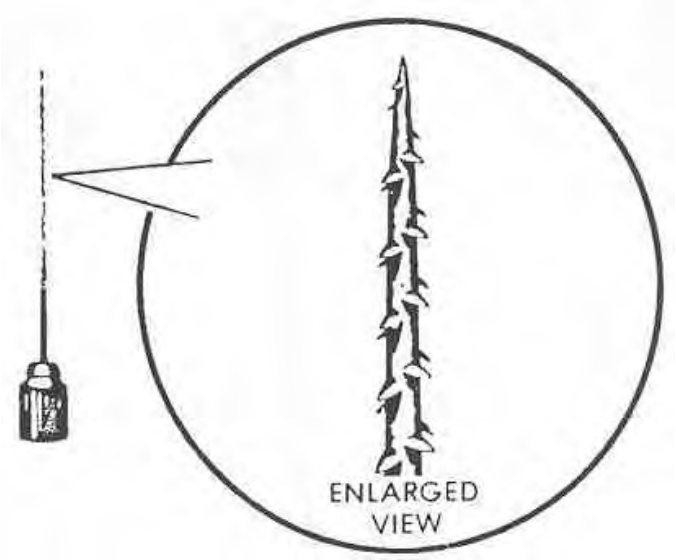


Figure 4-16. Root canal broach.

c. **Root Canal Reamer (REAMER SET, PULP CANAL.)** Root canal reamers (figure 4-17) are used to enlarge the root canal. They are available in a set of 15 standard sizes, with either short or long handles, from size 10 to 100.

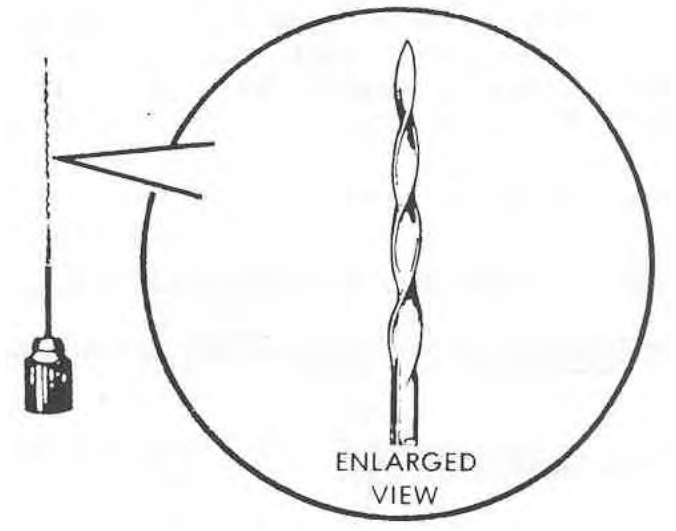


Figure 4-17. Root canal reamers.

d. **Root Canal Files (FILE SET, PULP CANAL, DENTAL).** Root canal files (figure 4-18) are used to enlarge and smooth the walls of the root canal. They are available in a set of 12 standard sizes with short handles (21 mm) and a set of 15 similar sizes with long handles (25 mm). Root canal files are also available in a Hedstrom set of six assorted sizes with long handles in a 25 mm end length. The various sizes of reamers and files allow incremental cleaning and enlargement of the pulp canal.

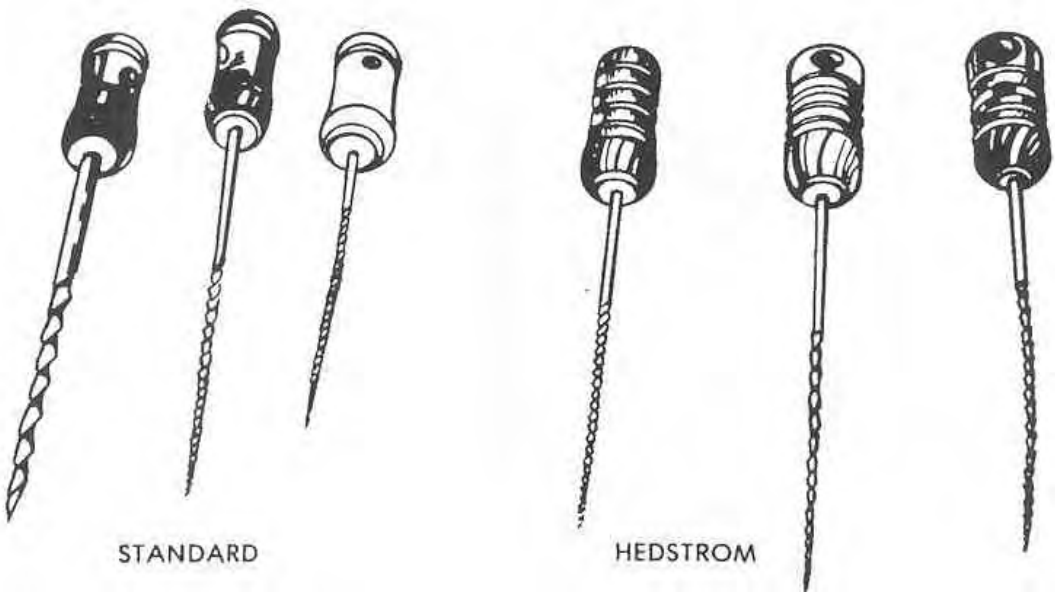


Figure 4-18. Root canal files.

e. **Root Canal Pluggers (PLUGGER, PULP CANAL).** Root canal pluggers and spreaders (figure 4-19) are used to pack root canal filling materials into the root canal. Six different pluggers are available. Ladmore pluggers 1, 3, and 5 are different-sized straight pluggers. Pluggers 7, 9, and 11 are different-sized contra-angle pluggers. Root canal spreaders are not available as standard items of medical supply. Each individual dental officer will use various pluggers and spreaders according to his individual technique.

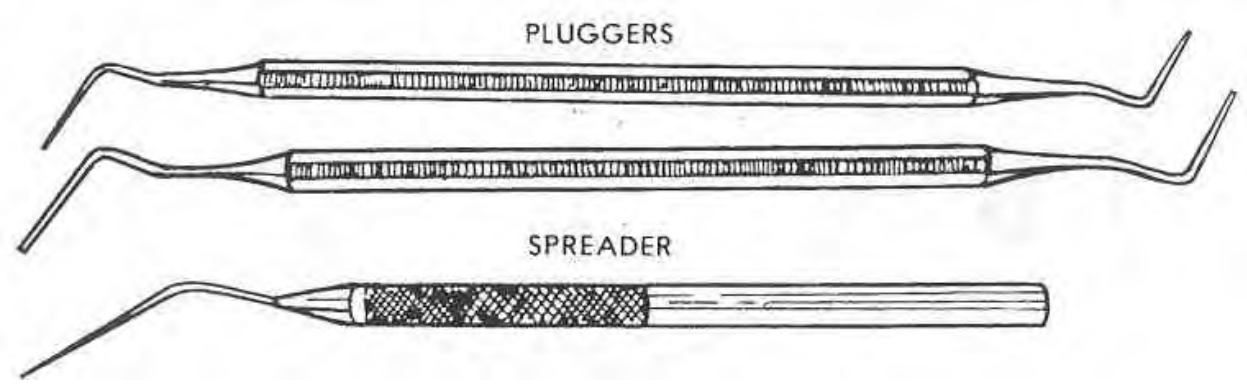


Figure 4-19. Root canal pluggers and spreaders.

f. **Instrument and Material Numbering System.** Files and reamers are numbered progressively with increases in size. Gutta-percha points and silver points are sized to correspond with the instrument numbering system. For example, number 50 silver point correspons to number 50 file or reamer. Paper points are available in sizes of fine, extra fine, medium, and extra coarse. See figure 4-20.

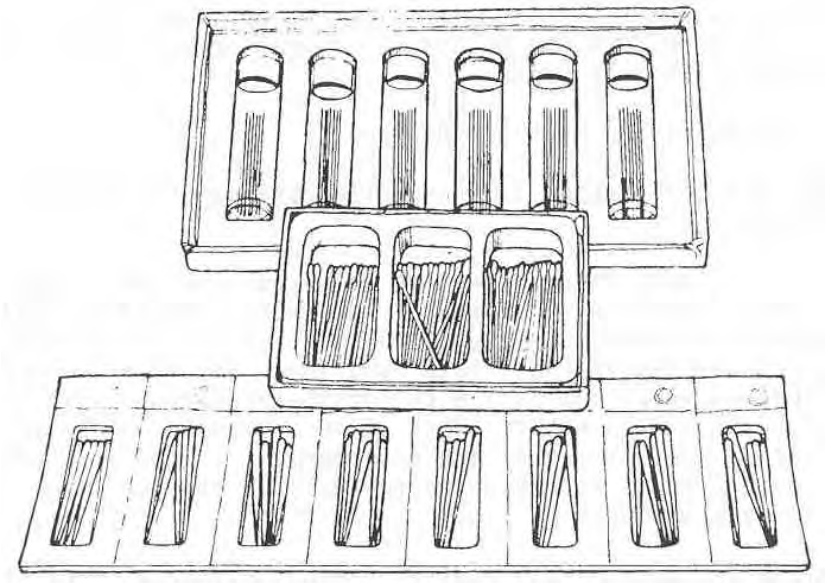


Figure 4-20. Gutta-percha points, silver points, and paper points.

NOTE: See appendix A for items listed in typical endodontic instrument setups.

4-8. INSTRUMENT SETUPS AND PROCEDURES

a. **Preparing for the Patient.** Preparation for the patient includes cleaning and sterilizing of instruments and equipment used for the previous patient, and the placement of linens, headrest covers, and bracket table covers for the new patient. It also includes setting out the patient's records and radiographs for reference by the dental officer and preparing appropriate instruments and equipment setups. All unit instruments such as handpieces and air and water syringes should be wiped vigorously with an alcohol-saturated sponge. If the unit is not to be used immediately, alcohol-saturated sponges should be draped or wrapped around the unit instruments to keep the unit clean.

b. **Use of Auxiliary Aids for Diagnosis.**

(1) The pulp tester is frequently used in the endodontic service as an aid to diagnosis.

(2) If a cold thermal test is required, the dental specialist should have a small pencil of ice ready. The pencil should be small enough to allow the dental officer to apply it to one tooth at a time and should be prepared with a gauze pad to facilitate handling. To prepare a pencil of ice, remove the rubber plunger from a 1.8 cc anesthetic Carpule™ with an explorer. Fill the glass Carpule™ with water and place it in a paper drinking cup which is then set in the freezing compartment of the refrigerator. When a pencil of ice is needed, the frozen Carpule™ is run under tap water. The ice slips from the Carpule™ to present the pencil of ice.

(3) If a warm thermal test is needed, either a piece of temporary stopping (gutta-percha) or an egg-shaped burnisher warmed over the flame of a Bunsen burner may be used. During this procedure, the dental specialist should have the water syringe ready to cool the tooth if the test causes too much pain.

c. **Use of Anesthesia**. If the endodontist plans to use a local anesthetic, the dental specialist should have the necessary instruments ready.

d. **Application of Rubber Dam**. After the administration of the local anesthetic, the dental specialist should have the rubber dam equipment ready for use by the dental officer. Once the dam is applied, the operative area is rendered aseptic by swabbing with 70 percent isopropyl alcohol or other suitable antiseptics. If a rubber dam clamp is used and a multiple appointment method of treatment is to be followed, recording the number of the rubber dam clamp used may save time at later appointments.

4-9. ROOT CANAL TREATMENT (CONSERVATIVE THERAPY)

a. **General.** In preparing for root canal treatment, the dental specialist should always refer to the patient's record. By doing this, he can go through each step of treatment required and lay out each item systematically before treatment starts. This procedure will eliminate rushing to retrieve materials and make the treatment steps progress smoothly and orderly.

b. **Steps for Treatment.** The sequence of treatment for the single appointment method of endodontic treatment is given below. Also, review figure 4-15.

(1) Anesthesia.

(2) Rubber dam application.

(3) Making the area aseptic.

(4) Access to pulp chamber.

(5) Pulp extirpation.

(6) Trial radiograph with instrument in place.

(7) Calculating exact measurement.

(8) Reaming and filing of root canal to measurement.

(9) Irrigation.

(10) Desiccation.

(11) Selecting, sterilizing, and fitting the point.

(12) Trial radiograph with point in place.

(13) Cementation of point.

(14) Sealing of access opening.

(15) Final radiograph.

c. **Preparing the Root Canal.** For the single appointment method of treatment, the dental specialist should remember the above outline or a similar one. In gaining access, he should provide high and low speed burs, No. 8, No. 6 or No. 701, and a pointed green stone. A barbed broach is used for extirpation of the pulp. Two small Luer-lock syringes, 2 to 5 cc, with 18-gauge needles with the beveled end cut off and bent at about 90º, are used to irrigate the tooth. One syringe is filled with hydrogen peroxide and the other with sodium hypochlorite (household liquid bleaching agent). Use of medicament varies among dental officers. Dappen dishes are kept filled from plastic squeeze bottles and 2-inch by 2-inch sponges are provided to absorb the overflowing solution. Desiccation or drying of the root canal is done by the use of paper absorbent points--extra fine, fine, medium, or coarse. The endodontic assistant should set out an assortment of paper points for the dental officer. A radiograph with the measured instrument placed in the canal is exposed to determine the exact length of the root canal. The dental specialist then should provide a sequential assortment of reamers and files of increasing size. The beginning size is determined by the dental officer. The reamers and files should be provided with rubber stops. The canal is instrumented to the stop until clean, white cuttings are obtained. A corresponding size point, either silver or gutta-percha, is selected and trial-fitted. Once the point passes the trial fit, it is ready for cementation. The dental specialist should now be prepared to mix the root canal cement. If the zinc oxide and eugenol technique is used, relatively large portions of powder are added to the liquid and spatulated until a heavy, creamy, nongranular mix is obtained. When the mix is complete, the cement should be drawn up from the mixing slab about 1 inch without separating. This test is done by dabbing the spatula into the mix and drawing it up slowly. The cement is given to the dental officer who places it in the canal with a reamer. The point is coated with cement and seated into place.

d. **Filling and Sealing the Root Canal.** A small mosquito hemostat, 5 1/2 inches, is usually used for placing a silver point in the canal. A silver point pliers is the instrument used to seat the point in the canal. When gutta-percha points are used, cotton forceps are used to place the point. Depending on the technique, a plugger, a spreader, or both, are used to condense the gutta-percha in the canal. In other techniques, both gutta-percha and silver points are used at the same time. A trial radiograph of the root canal filling is taken and, if it is satisfactory, a thick mix of zinc oxide and eugenol or zinc phosphate cement is made and plugged into the access area to completely seal the canal. A number three Ladmore plugger is the instrument of choice for plugging the access opening with the cement.

e. **The Multiappointment Method.** The sequence of treatment for the multiappointment method of endodontic therapy differs from the single appointment method in that the sequence is interrupted at various stages to allow for drainage of infected material, for changing of medications in the root canal, or to alleviate a lengthy appointment. Medications commonly used in endodontic techniques include cresatin and camphorated paramono-chloro-phenol, which are placed in dappen dishes and then placed into the root canal by using paper points or into the pulp chamber by using cotton pellets. The tooth is then sealed and kept sealed until the next appointment. Occasionally, bacterial cultures are done each time the root canal dressing is changed. Root canal therapy is completed after a negative culture is obtained.

f. **Follow-up Appointments.** Upon completion of the treatment by either method, arrangements should be made to recall the patient 6 months later for a follow-up radiograph to determine the success of the treatment.

g. **Sterilization.** Successful endodontics depends greatly upon sterility. Anything placed into the tooth must be sterilized. Hot salt, glass bead, and molten metal sterilizers are used for sterilization of and working endodontic instruments. Broaches, files and reamers, paper points and cotton pellets are submerged in the sterilizer for not less than 10 seconds.

4-10. APICOECTOMY SURGICAL ENDODONTIC THERAPY

a. **General.** Apicoectomy is defined as the excision of the apical portion of the tooth root through an opening made in the overlying labial or buccal alveolar bone and oral mucosa. There are indications and contraindications for using this procedure. The dental officer will evaluate each case. Surgical techniques, instruments, and materials vary with the operator.

b. **Preparation.** The dental specialist should make certain that all instruments to be used have been sterilized and are ready. If the patient has received preoperative medication, he must be watched closely. The dental specialist should be alert to any unfavorable reactions during the surgery and report them to the dental officer.

c. **Procedure.** Before this phase of treatment, endodontic treatment of the root canal of the tooth will have been performed. On the day of surgery, the dental specialist should have the patient's radiographs nearby and should prepare the necessary instruments for the operation. During the operation, the endodontic assistant must be prepared to evacuate fluids and material from the site of incision and the floor of the mouth. The assistant's technique of irrigation and evacuation of debris is essential for good visibility. During the suturing, the dental specialist must keep visibility at a maximum and use the scissors to cut suture material after each is tied. He also cleans the patient's face, plans a future appointment, and records postoperative instructions of the dental officer.

4-11. CARE AND CLEANING OF INSTRUMENTS

a. **Alcohol Bath on a Cotton Roll.** Endodontic files and reamers should be cleaned by being placed in a cotton roll saturated with alcohol and rotated counterclockwise. While pinching the cotton, the dental specialist withdraws the instrument. This procedure removes debris from the furrows of instruments. It is repeated as often as necessary.

b. **Inspection of Instruments.** At this time, the dental specialist should inspect instruments for any remaining debris and signs of wear or instrument strain. Instrument strain is recognized by sharp bends, stretching of the metal (convolutions appear uneven), or rusting. These changes appear most often at the tip end of the instrument. A broken instrument in a root canal often causes failure.

c. **Sterilizing and Storing.** After the instruments have been examined, they should be sterilized and replaced in the instrument cabinet. Barbed broaches are used once and discarded.

d. **Special Care for Burs.** All burs used in treatment should be cleaned with a bur brush, sterilized, and replaced in their working order. The burs should not be placed in water. It will rust them. Also, sterilization solutions should have a rust-inhibiting agent (such as sodium nitrate) added.

e. **The Cleaning of Surgical Equipment.** All surgical equipment should be scrubbed with soap and water, reassembled into the surgical pack, and autoclaved.

4-12. SAFETY PRECAUTIONS

a. **Be Cautious with Sharp Instruments.** The endodontic assistant should always keep in mind the sharpness of, and the infected debris on, the end of a file or reamer. He should make every effort to handle the instruments with care.

b. **Always Lay Instruments Flat.** All instruments should be laid flat, always. Short-handled instruments, such as files or reamers, can stand on end if they are tossed carelessly into a sterilizer container or a drawer or onto the bracket table. Then, the next person retrieving an instrument may bayonet his hand or finger. If that happens, the instrument should be removed carefully and gently. Bleeding should be encouraged. The wound should be washed with surgical soap and an antiseptic applied immediately. Any signs of infection should receive proper treatment.

c. **Handle the Hot Sterilizer Carefully.** The hot instrument sterilizer (glass bead, hot salt, or molten metal) must be handled carefully to keep from burning the operator, the assistant, and the patient. The sterilizer operates at 450° F. It should be positioned so that it is readily available to the dental officer, but cannot be touched accidentally.

Continue with Exercises

EXERCISES, LESSON 4

INSTRUCTIONS. The following exercises are to be answered by marking the lettered response that best answers the question or best completes the sentence or by following the special instructions.

After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers.

SPECIAL INSTRUCTIONS: For exercises 1 through 7, match the periodontic instrument characteristic in column A with the appropriate periodontic instrument in column B. Write your answers in the spaces provided. Items in column A may have more than one correct answer. Items in column B may be used more than once.

Column A

___ 1. Especially designed for incising soft tissue surrounding teeth.

___ 2. Used to measure loss of attachment of the tooth.

___ 3. Used to remove calculus from the crowns of teeth.

___ 4. Used for removal of soft tissue linings of the periodontal pockets.

___ 5. Used to determine contour of bone resorption about a tooth.

___ 6. Used to determine the depth of soft tissue pockets.

___ 7. Used for heavy deposits of supragingival calculus.

Column B

a. Periodontic scalers.

b. Periodontal hoes.

c. Periodontal files.

d. Periodontal pocket marker.

e. Periodontal knives.

f. Periodontal probes.

g. Periodontal curettes.

8. Which of the following items would you NOT place in the instrument setup for a gingivectomy?

   a. Suture needle.

   b. Periodontal knife.

   c. Hemostats.

   d. Rongeur forceps.

9. In treating periodontal disease:

   a. More emphasis is placed on mechanical technique than on restoring function.

   b. The ultrasonic dental unit is used to plane the root surface of teeth.

   c. The dental officer is the only person who can give oral hygiene instructions.

   d. The periodontal pack is usually mixed immediately before use.

10. Endodontic treatment:

   a. Does not involve surgery.

   b. Involves obturating the root canal, in conservative therapy.

   c. Includes extraction of teeth.

   d. Deals with diseases of the gingiva.

SPECIAL INSTRUCTIONS: For exercises 11 through 14, match the endodontic Instrument characteristic in column A with the appropriate endodontic instrument in column B. Write your answers in the spaces provided.

Column A	Column B
___ 11. Used to remove pulp from the root canal.	a. Root canal broach.
___ 12. Used to smooth the walls of the root canal.	b. Root canal reamer.
___ 13. Used to enlarge the root canal.	c. Root canal files.
___ 14. Used to pack filling materials into the root canal.	d. Root canal pluggers.

15. If conservative endodontic therapy is used on a vital tooth, which of the following procedures is performed FIRST?

    a. Administer anesthesia.

    b. Extirpate the pulp.

    c. Make the tooth aseptic.

    d. Apply the rubber dam.

    e. Desiccate the root canal.

16. In the single appointment method of endodontic therapy:

    a. Cresatin is placed into the pulp chamber by using cotton pellets.

    b. Bacterial cultures are done periodically.

    c. Radiographs are taken periodically during the procedure.

    d. Infected material is allowed to drain over a period of time.

17. In cleaning endodontic files and reamers:

    a. Reamers are rotated counterclockwise in an alcohol-saturated cotton roll.

    b. Burs should be soaked in water 10 minutes.

    c. Scrub the cement slab and spatula with tincture of metaphen.

    d. Discard the files, rather than clean them.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 4

1. e (para 4-2i)
2. f (para 4-2g)
3. a (para 4-2b)
4. g (para 4-2c)
5. d (para 4-2f)
6. d (para 4-2f)
7. b, c (paras 4-2d, e)
8. d (parass 4-2a, 4-3c(2); figure 4-11)
9. d (paras 4-3c(2), (3)(a))
10. b (para 4-5a(1))
11. a (para 4-7b)
12. c (para 4-7d)
13. b (para 4-7c)
14. d (para 4-7e)
15. a (para 4-9b(1))
16. c (paras 4-9b (6), (12), (15))
17. a (para 4-11a)

End of Lesson 4

LESSON ASSIGNMENT

LESSON 5	Prosthodontic Instruments.
LESSON ASSIGNMENT	Paragraphs 5-1 through 5-15.
LESSON OBJECTIVES	After completing this lesson, you should be able to:

5-1. Define the meaning of prosthodontics.

5-2. State the meaning of the prosthodontic terms defined in the lesson.

5-3. Identify the instruments and equipment used in prosthodontics.

5-4. Identify the purposes of each of the five treatment visits by the patient related to complete dentures.

5-5. Identify the types of materials used for impressions.

5-6. Identify the duties of the dental specialist in regard to complete dentures.

5-7. State the three types of jaw relationships.

5-8. State the purpose of a complete denture try-in.

5-9. Identify the sequence used in developing a removable partial denture.

5-10. Identify the duties of the dental specialist in respect to removable partial dentures.

5-11. Identify the information provided in TB MED 148 and TC 8-226 which must be used by the dental specialist.

SUGGESTION After studying the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 5

PROSTRODONTIC INSTRUMENTS

Section I. INTRODUCTION

5-1. GENERAL

a. **Prosthodontics**. Prosthodontics is that branch of dentistry pertaining to the restoration and maintenance of oral function by the replacement of missing teeth and structures by artificial devices. Removable prosthodontics involves constructing artificial devices that can be readily inserted and removed by the wearer.

b. **Dental Prosthesis**. Complete dentures and fixed and removable partial dentures make up the great bulk of dental prosthesis. The prosthodontic section may also construct metallic or acrylic resin splints to be used by the oral surgeon in the immobilization of fractured jaws or by the periodontist to support periodontally weakened teeth. The repair, reline, or rebase of a prosthesis also is done in this section. Occasionally, an obturator or some other type of maxillofacial prosthesis is made to correct a developmental defect or a defect resulting from a traumatic injury.

5-2. PROSTHODONTIC TERMS

a. **Abutment**. A tooth used for the support or anchorage of a fixed or removable prosthesis.

b. **Adjustment**. A modification of a denture base or the teeth on a denture after the prosthesis has been completed and inserted in the mouth.

c. **Baseplate**. A temporary form representing the base of the denture that is used for making maxillomandibular records, for arranging denture teeth, or for trial insertion in the mouth.

d. **Cast**. A positive reproduction of the form of the tissues of the maxillae or mandible. After the impression of the tissues has been made, plaster of Paris or artificial stone is poured into the impression to form the cast. Denture bases or other dental restorations may be fabricated over these casts.

e. **Clasp**. A part of the removable partial denture which acts as a direct retainer or stabilizer for the denture by partially surrounding or contacting an abutment tooth.

f. **Complete Denture**. A prosthesis which replaces teeth and associated structures in a complete edentulous arch.

g. **Cuspid Line**. A vertical line scribed on the occlusion rim to indicate the position that the artificial cuspid tooth is to occupy in the trial denture setup.

h. **Denture Base**. That part of a denture which rests on the oral mucosa and to which denture teeth are attached.

i. **Fixed Partial Denture**. A partial denture that cannot be removed readily by either the patient or the dental officer. It is permanently attached to the teeth that furnish the support to the restoration.

j. **Immediate Denture**. A dental prosthesis constructed for insertion immediately following the removal of natural teeth.

k. **Impression**. An imprint or negative form of the teeth or other tissues of the oral cavity made in a plastic material that becomes relatively hard or set while in contact with these tissues. Material is poured into this impression to produce a positive form or cast of the recorded tissues. Impressions are classed according to the type of material of which they are made, according to the structures included or recorded in the impression material, or according to the purpose, such as partial denture impression or complete denture impression.

l. **Interocclusal Record**. A record of the positional relation of the teeth or jaws to each other, usually made of a plastic material which hardens. Its purpose is to relate the casts in the same position on the articulator.

m. **Occlusal Equilibration**. The modification of occlusal forms of teeth by grinding with the intent of equalizing occlusal stress or harmonizing cuspal relations.

n. **Occlusion Rim**. An occluding surface built on a temporary or permanent denture base to make records showing the relationship of the maxillae to the mandible or to arrange artificial teeth.

o. **Removable Partial Denture**. A prosthesis that replaces one or more, but less than all, of the natural teeth and associated structures and is supported by the teeth or the mucosa. It can be readily inserted and removed by the wearer.

p. **Rest**. An extension from a prosthesis that affords vertical support for a restoration. It is named for the area of the tooth it contacts, for example, occlusal rest.

q. **Rest Position**. The habitual postural position of the mandible when the patient is resting comfortably in the upright position and the condyles are in a neutral, unstrained position in the mandibular fossae.

r. **Try-in**. A preliminary insertion of a complete denture wax-up, a partial denture casting, or a finished restoration to determine the fit, esthetics, and maxillomandibular relation.

s. **Vertical Dimension**. A vertical measurement of the face between any two arbitrarily selected points that are conveniently located one above and one below the mouth, usually in the midline.

Section II. INSTRUMENTS AND EQUIPMENT

5-3. GENERAL

Instruments and equipment commonly used in prosthodontics are described in this section. Medical Supply Catalog nomenclature is capitalized in parentheses following the common name of each item.

5-4. DESCRIPTION OF INDIVIDUAL ITEMS

a. **Impression Tray (IMPRESSION TRAY, DENTAL)**. Impression trays (figure 5-1) are carriers for the material used in making impressions of the teeth, alveolar ridges, and adjacent structures. They are manufactured in various sizes and shapes to accommodate the size and shape of the arch, the type of impression material to be used, and the impression technique to be followed.

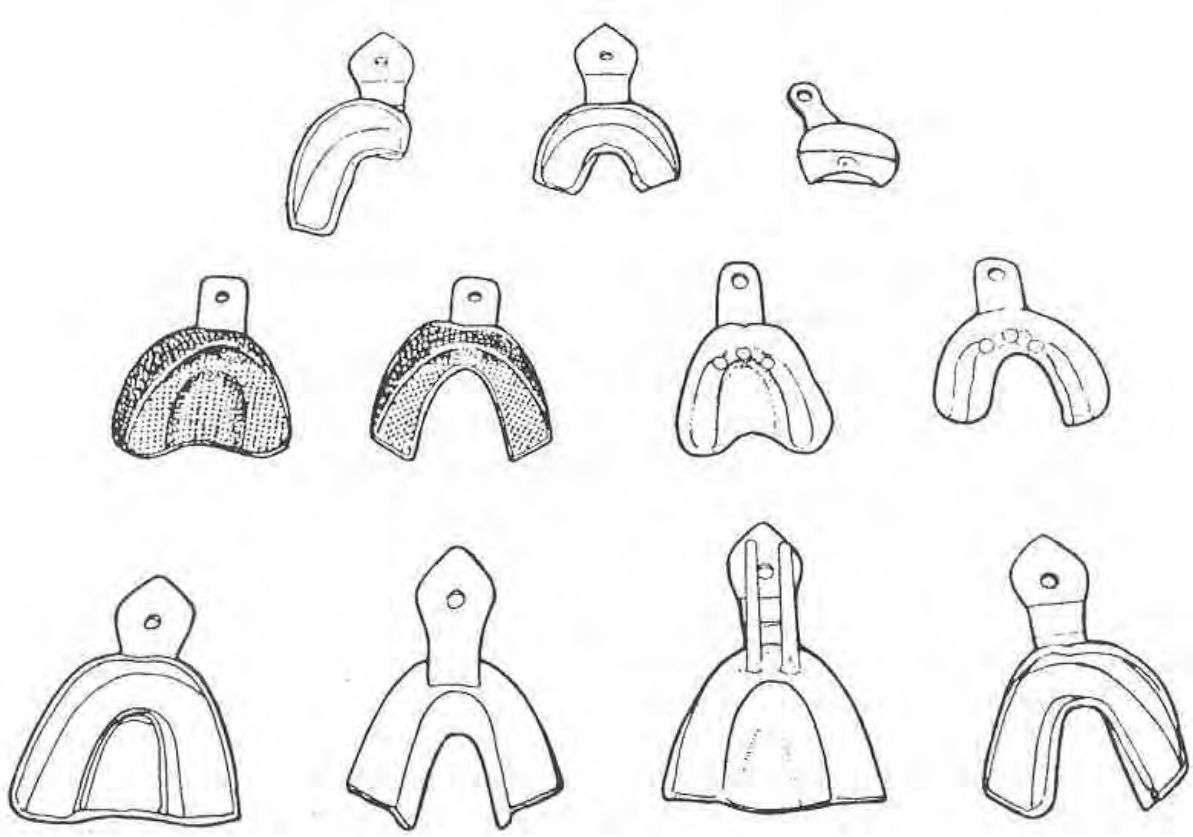


Figure 5-1. Impression trays.

(1) Edentulous impression trays. Two types of edentulous impression trays are available. One type is for use with modeling plastic or compound and is made of a pliable metal alloy that can be shaped by bending and cutting to fit the individual patient. Mandibular tray sizes are Nos. 51, 53, and 46. Maxillary tray sizes are Nos. 41 and 45. The second type is for use with hydrocolloid impression material and is made with rimmed borders to retain the impression material. Sizes available are small, medium, medium large, and large. Both types of trays are used for impressions when no teeth remain in the arch.

(2) Dentulous impression trays. These trays are made with rimmed borders to retain the impression material in the tray when the impression is removed from the mouth. Trays can be bent, within limits, to accommodate either a wide arch or a narrow arch, but they should not be cut. They are available in small, medium, medium large, large, extra large, and extra-extra large sizes for both maxillary and mandibular impressions. They are used when teeth are present in the arch.

(3) Orthodontic impression trays. These trays have deeper flanges than the standard edentulous trays. They are provided in large, medium, medium-small, and small sizes for maxillary impressions and in large, medium, and small sizes for mandibular impressions.

(4) Partial impression trays. Partial impression trays are provided in three designs for making impressions of anterior portions of the dental arch. The designs are maxillary anterior medium, maxillary anterior small, and mandibular anterior.

(5) Crown and bridge tray. A single-size crown and bridge tray is adaptable for making impressions of a small segment in any location of either arch.

(6) Custom acrylic trays. Often, the procedure performed requires impression trays constructed especially for the patient being treated. The custom-made trays are made from self-curing acrylic resin and constructed by a dental laboratory specialist. The custom acrylic trays obtain an accurate impression of edentulous and partially edentulous dental arches by maintaining a uniform thickness (1 to 2 mm) of the impression material. Custom acrylic trays may be used during treatment requiring construction of complete dentures, removable partial dentures, or fixed partial dentures.

b. **Alcohol Torch (BLOWTORCH, ALCOHOL)**. The alcohol blowtorch (figure 5-2) is designed to be held and operated in one hand. It has a plunger which, when pushed in, ejects a stream of air to produce a pinpoint flame used to apply heat to small, localized areas of wax, modeling plastic, or other material. Either ethyl or methyl alcohol may be used for fuel.

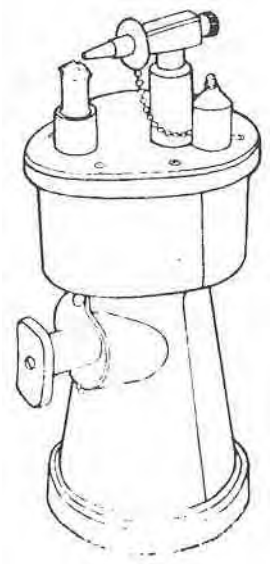


Figure 5-2. Alcohol blowtorch.

c. **Compound Heater (BATH, WATER, DENTAL IMPRESSION COMPOUND).** The compound heater (figure 5-3) is an electrically operated water bath used to soften modeling plastic. Temperature of water is controlled thermostatically.

Figure 5-3. Dental impression compound water bath.

d. **Spatulas (SPATULA, LABORATORY) (SPATULA, DENTAL)**. Spatulas are used for mixing impression material and artificial stone and heating and manipulating wax. Laboratory spatulas are made of hard rubber or of metal with wooden handles (figures 2-10 and 2-11). They are listed in the Medical Supply Catalog under class 6640 items.

e. **Plaster Bowls (BOWL, PLASTER OF PARIS MIXING)**. Plaster bowls are made of rubber and are used for mixing impression materials, plaster, stone, and investment materials. They are available in four sizes--extra large, large, medium, and small.

f. **Mold and Shade Guides (GUIDE, MOLD, DENTAL)(GUIDE SHADE, TEETH)**. Denture teeth and facings are made in a variety of sizes, forms, and shades by many tooth manufacturers. Size and form are identified by letter or number as are the shades. Mold and shade guides (figure 5-4) are available for denture teeth and facings as special purchase items.

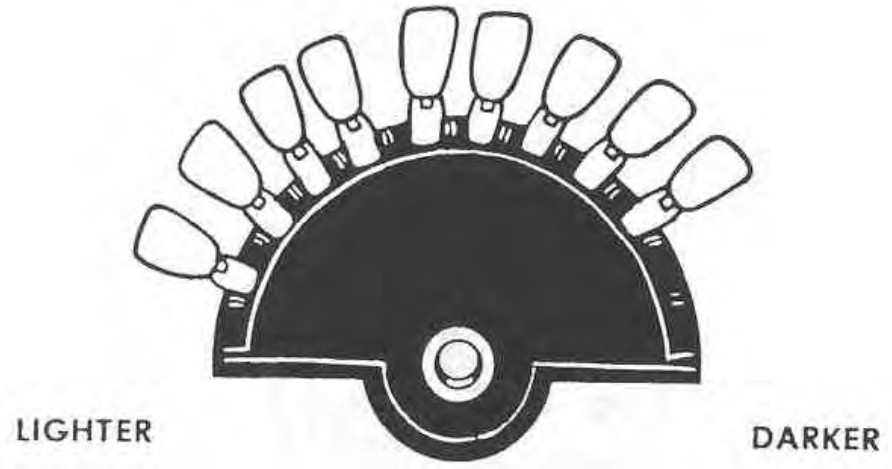


Figure 5-4. Shade guide.

g. **Millimeter Gauge (CALIPER, VERNIER)**. The millimeter (Boley) gauge (figure 5-5) is a measuring instrument calibrated in tenths of millimeters. It is used in prosthodontics for determining tooth dimensions and making other measurements. This item is listed in the 5110 series of the Medical Supply Catalog.

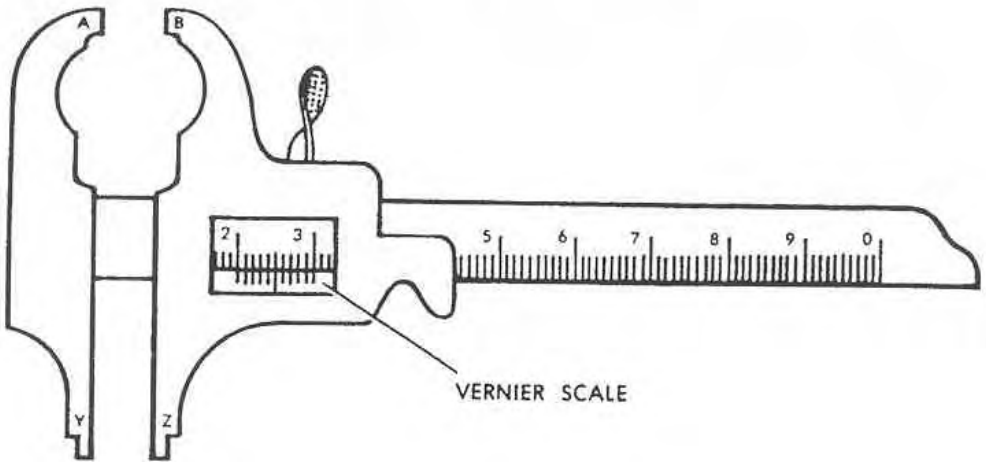


Figure 5-5. Millimeter (Boley) gauge.

h. **Articulators (ARTICULATOR, DENTAL)**. An articulator is a mechanical device that represents the temporomandibular joints and jaw members to which maxillary and mandibular casts may be attached. Articulators are classed as nonadjustable and adjustable.

(1) Nonadjustable. Nonadjustable articulators (figure 5-6) permit opening, closing, protrusive and lateral movements at a fixed, average inclination. For example: Stephan Model Plainline.

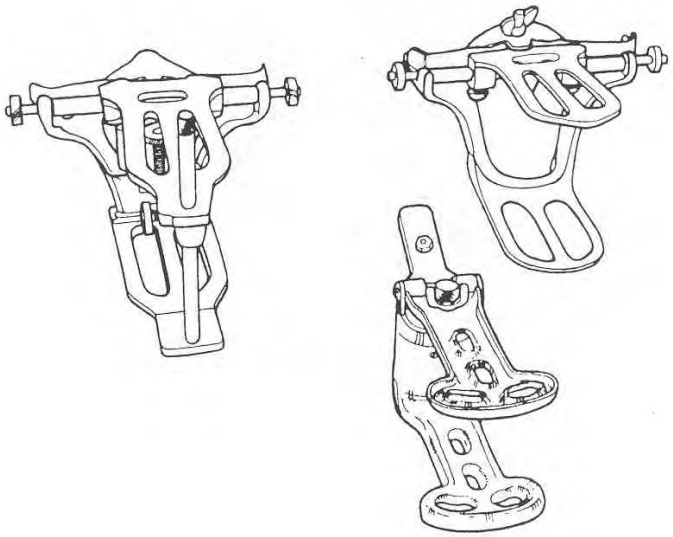


Figure 5-6. Nonadjustable articulators.

(2) Adjustable. Adjustable articulators permit opening, closing movements and adjustment of condylar elements that can be set to accept a protrusive record. For example: Hanau Model H (figure 5-7).

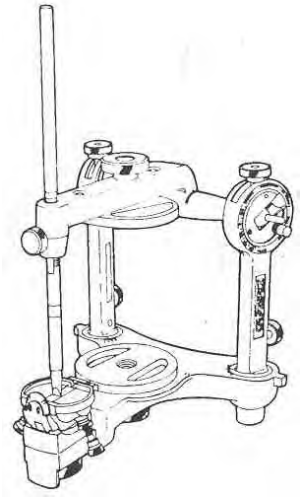


Figure 5-7. Adjustable (Hanau) articulator.

i. **Face Bow (FACE BOW, ARTICULATOR DENTAL)**. The face bow (figure 5-8) is an instrument used to register and record the positional relationship of a patient's maxillae to his temporomandibular joints and to mount a cast of his maxillary arch in the same relationship to the hinge axis of an articulator. The face bow is fitted with a bite fork that is used to attach the face bow to the upper occlusion rim.

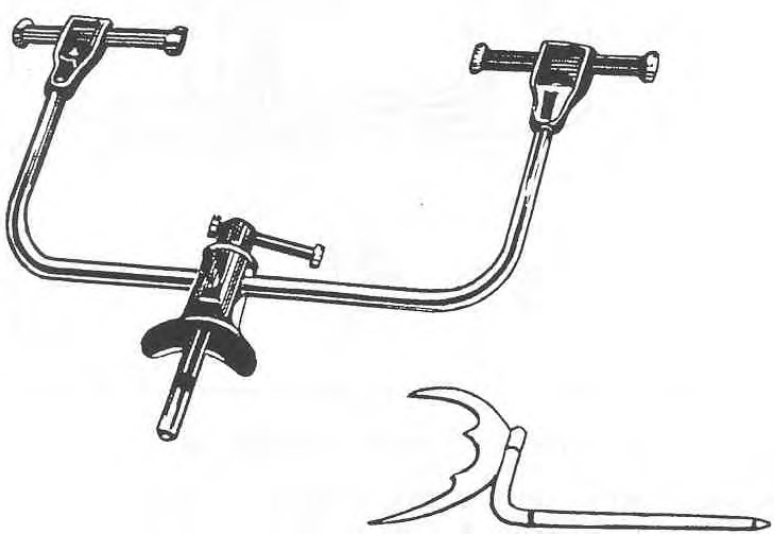


Figure 5-8. Face bow with bite fork.

j. **Needle Point Tracer (GRACER, GOTHIC ARCH, DENTAL)**. The needle point-tracer (figure 5-9) is a mechanical device used to indicate or record the direction and extent of movements of the mandible. It is also used to indicate the relative horizontal position of the mandible to the maxilla.

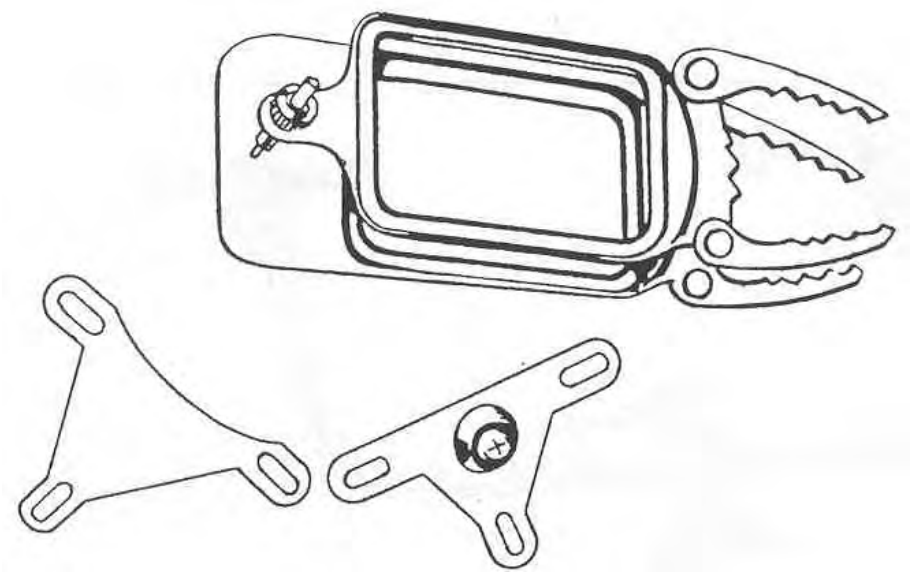


Figure 5-9. Needle point-tracer.

k. **Compound Knife (KNIFE, DENTAL COMPOUND)**. The compound knife is useful in trimming modeling plastic, impression materials, and waxes. Its handle is designed to accept interchangeable blades.

l. **Mounted and Unmounted Stones, Points, and Abrasive Disks**. These motor-driven rotary cutting and abrasive instruments are used in modifying natural teeth and adjusting and finishing dentures.

Section III. PROCEDURES

5-5. GENERAL

The procedures followed in providing removable prosthodontic care vary with the prosthodontist. Common procedures and guidelines for the dental specialist as an assistant in removable prosthodontics are described in this section.

5-6. DUTIES OF THE DENTAL SPECIALIST

The general clinical duties of the dental specialist apply to the dental specialist assigned to the prosthodontic section. For example, preparation to receive a patient begins immediately following the dismissal of the previous patient. All evidence of treatment of that patient should be removed. Impressions, casts, dentures, and other materials used by the previous patient should be taken to the laboratory or placed in a suitable location out of sight of the patient. Records, instruments, supplies, and equipment required by the new patient must be assembled and placed in a convenient location for the dental officer.

a. Specific duties require the dental specialist to be familiar with techniques and materials used by the prosthodontist. If either modeling plastic or reversible hydrocolloid impression material is indicated for use, the dental specialist should prepare this material ahead of time.

b. In addition, the dental specialist should learn to work with patients who are under stress. Some patients will accept dentures and adjust to them easily. However, other patients will not accept dentures and will not adjust to them easily. The dental specialist should be aware of these psychological differences and guide his conversations with the patient accordingly.

5-7. COMPLETE DENTURES

a. **Appointments**. Most complete denture techniques require five appointments. On the first appointment, the patient is examined and preliminary impressions are made. The purpose of this is to evaluate the patient and to plan treatment. Diagnostic casts are poured from the preliminary impressions. On the second appointment, final impressions are completed from which the master cast is poured. The purpose of this procedure is to fabricate accurate casts upon which the dentures will be made. On the third appointment, jaw relationship registrations are made for transferring from the patient to the articulator all the positions and information necessary to fabricate the dentures. On the fourth appointment, the trial denture is evaluated in the patient's mouth and on the articulator for esthetics, occlusion, and denture base contour. On the fifth appointment, the finished dentures are inserted into the patient's mouth. At this time, the dentures are adjusted for fit and occlusion and the patient is instructed in their use and maintenance and in oral health care. One or more subsequent appointments may be given for adjustment and evaluation of the dentures. Dental appointment systems vary from one clinic to another and can vary from one service to another service of the same clinic. Usually, the prosthodontic section has its own appointment system because the prosthodontist needs flexibility in determining the time needed for each appointment and a series of appointments works out well for prosthodontic procedures. The dental specialist must know the procedures and routines of the particular prosthodontist. A well-planned appointment schedule can increase the efficiency of the prosthodontic service.

b. **Impressions**. Impressions for complete dentures include all the teeth, alveolar ridges, and areas of muscle attachment in a single jaw. The type of impression material used will depend upon the purpose for which the impression is to be used, the impression technique to be employed, and the preference of the dental officer. Subcourse MD0502, Dental Clinical Materials, discusses the properties, uses, and manipulation of impression materials. Examples of typical instruments and materials used and a description of the dental specialist's duties in impression procedures follow. Preliminary impressions are used to construct study models before fabricating complete dentures. Final impressions are used to construct the master cast upon which the denture is fabricated.

(1) Preliminary impressions. Irreversible hydrocolloid is the most commonly used material for making preliminary impressions. Figure 5-10 depicts instruments and materials used for irreversible hydrocolloid impressions.

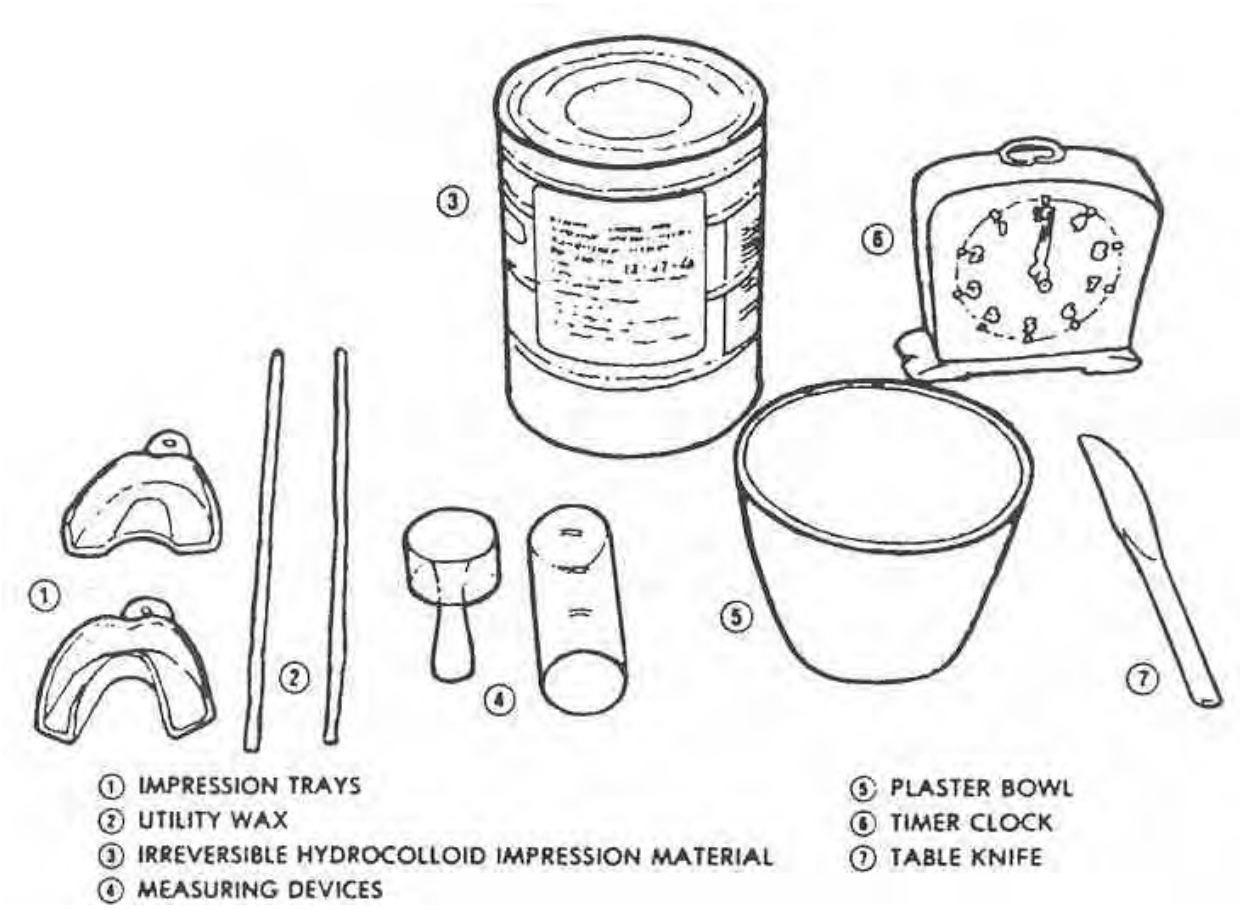


Figure 5-10. Instruments and materials for irreversible hydrocolloid impressions.

(a) When irreversible hydrocolloid is used, the dental specialist prepares the impression material in strict accordance with the manufacturer's instructions. During its manipulation, the assistant should prevent the entrapment of air bubbles in the material by sifting the powder into the water, by using a stirring rather than a whipping motion, and by spreading the mix around the walls of the mixing bowl just before completion. Mixing should be done in the time specified by the manufacturer. After the material is mixed, the impression tray is filled, the excess material in the bowl is presented to the dental officer, and then the filled tray is passed to the dental officer who will make the impression.

(b) Modeling plastic may also be used for making preliminary impressions. Figure 5-11 depicts instruments and materials used for modeling plastic impressions. In using modeling plastic, the dental specialist should lubricate the edentulous tray (selected by the dental officer) with petrolatum. The compound heater is filled with enough water to cover the compound and the heating element is adjusted to the proper temperature. After the modeling plastic has softened in the water bath, the lubricated tray is loaded. For maxillary impressions, the material is rolled into a ball and formed into the maxillary tray. For mandibular impressions, the material is rolled into a cylindrical shape and formed into the mandibular tray. After brush flaming and tempering of the material, the tray is passed to the dental officer who makes the impression. After the dental officer positions the tray in the mouth, the dental specialist may help speed the set of the modeling plastic by spraying cool water from the water syringe over the tray containing the material. If this is done, the saliva ejector is used to remove water as it collects in the patient's mouth.

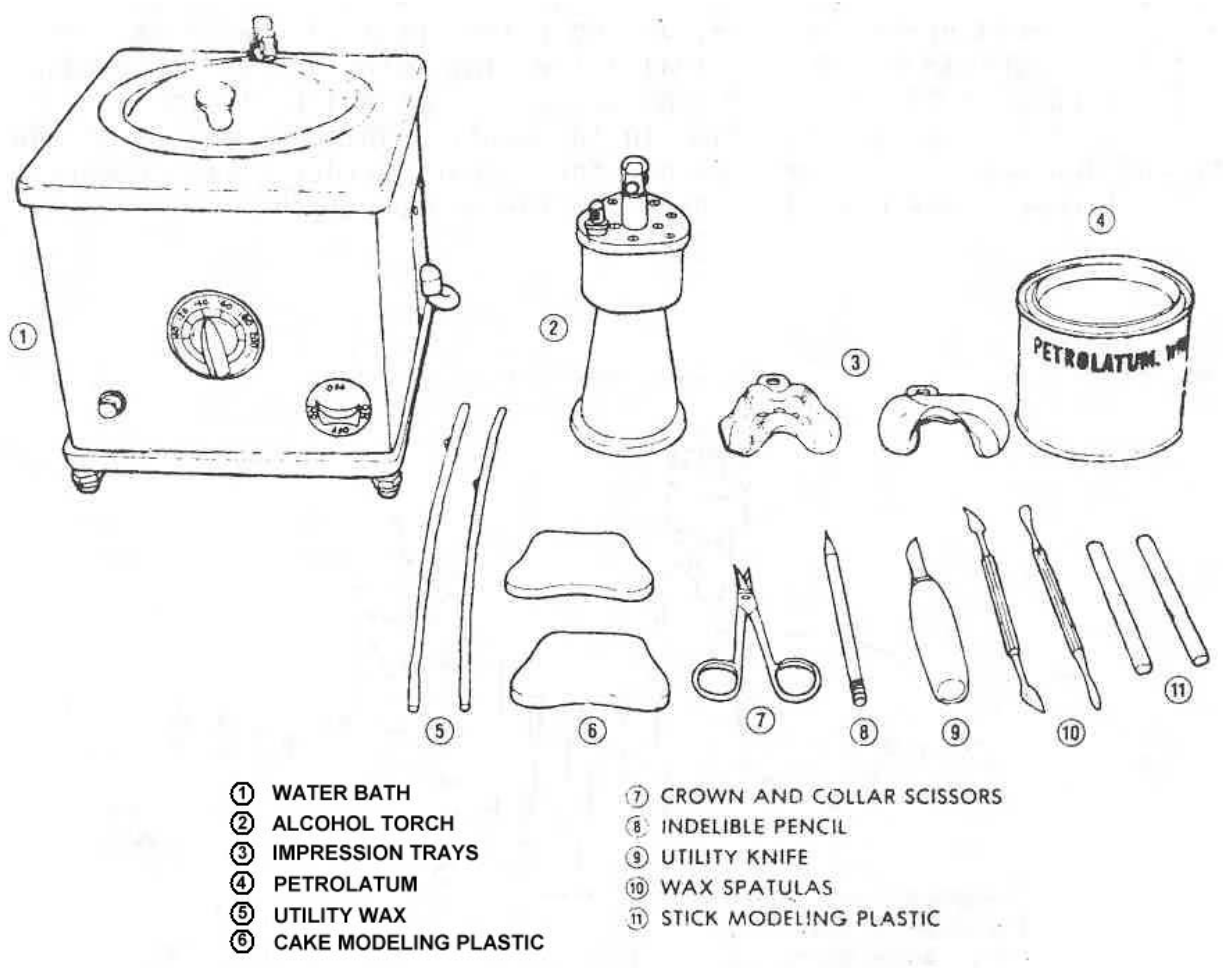


Figure 5-11. Instruments and materials for modeling plastic impressions.

(2) Final impressions. The final impression is used to produce the master cast upon which the denture is fabricated. The tray used for final impressions is made of an acrylic resin material that is custom-made on the cast produced from the preliminary impressions. This tray is adjusted to the patient's mouth by selective grinding. The borders are molded with modeling plastic to clearly define the soft tissue border and other landmarks, such as muscle attachments, frenum, and posterior palatal seal area. The molded tray is used to carry the final impression material, a rubber-base (polysulfide base) material, or a zinc oxide and eugenol paste (metallic oxide impression) material, to place in the mouth. This impression should include the denture supporting area and the denture border area. Figure 5-12 depicts instruments and materials used for final impressions.

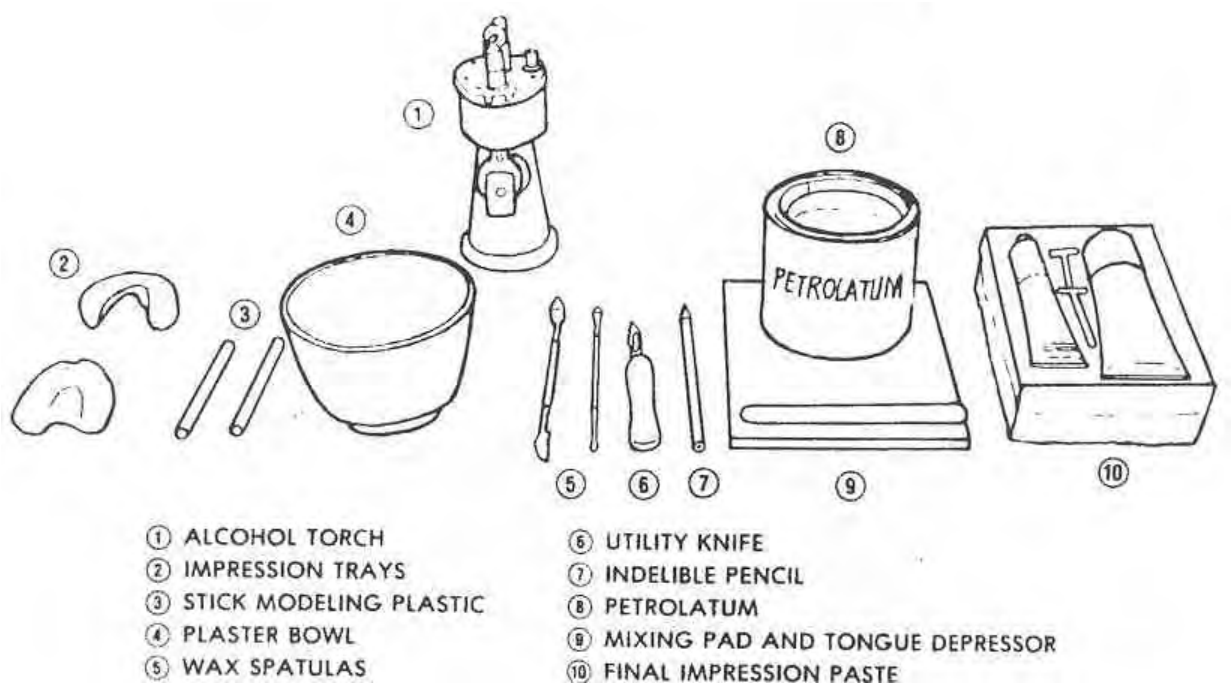


Figure 5-12. Instruments and materials for final impressions for complete dentures.

(3) Specific duties of the dental specialist. The dental specialist has specific duties in regard to the preparation of complete dentures. The dental specialist:

(a) Prepares the impression material according to the manufacturer's instructions and the techniques discussed in Subcourse MD0502, Dental Clinical Materials, and fills the impression tray.

(b) Coats the patient's lips and surrounding area with petrolatum before impressions are made to facilitate the removal of impression material.

(c) Cleans the instruments used to prepare the impression material before the material hardens on these instruments.

(d) Cleans any material from the patient's face and mouth after the impression has been removed. Oil of orange or oil of lemon is a good solvent for removing zinc oxide and eugenol impression pastes and rubber-base materials.

(e) Cares for the resulting impression by carefully handling the impression to avoid distortion or damage to tissue and peripheral areas of the impression.

(f) Washes the impression with cool water or cool slurry water (a solution of water and artificial stone or plaster of Paris) to remove saliva.

(g) Pours the master cast from which the complete denture is to be fabricated, if a dental laboratory specialist is not assigned to the clinic. Cast pouring procedures are described in TC 8-226, Dental Laboratory Specialist.

NOTE: The local SOP at each facility will describe exactly what must be done by the dental specialist.

5-8. JAW RELATIONSHIP RECORDS IN COMPLETE DENTURE FABRICATION

Three types of jaw relationships will be discussed--centric jaw relationship, maxillo-temporomandibular joint relationship, and lateral and protrusive relationship.

a. **Centric Jaw Relationship**. When final casts have been obtained and occlusion rims or trial bases fabricated, the next procedure is to determine the correct positional relationship of the maxillary cast to the mandibular cast for setting the denture teeth and establishing occlusion. Determinations are usually made and recorded in the mouth by using occlusion rims and one of the following materials--modeling plastic, plaster of Paris, or softened wax. A needle point-tracer (the gothic arch tracer) may also be used for this record (see figure 5-13). The recordings and occlusion rims are then transferred to the casts for mounting on the articulator.

b. **Maxillo-Temporomandibular Joint Relationships**. The prosthodontist may also record the relationship existing between the maxillae and the opening and closing axis of the temporomandibular joint. This registration is used to mount the maxillary cast on the articulator in the same relationship to the hinge axis of the articulator as the patient's maxillae to the temporomandibular joint. A face-bow registration is used to record this relation.

Figure 5-13. Instruments and materials for jaw relationship registrations in complete denture fabrication.

c. **Lateral and Protrusive Relationships**. Right and left lateral and protrusive positions of the mandible in relation to the maxillae may be registered by a needle point-tracing for transfer to an adjustable articulator.

NOTE: The shades and mold of denture teeth to be used are usually selected during this phase of complete denture fabrication.

5-9. COMPLETE DENTURE TRY-IN

Complete dentures are usually inspected in the mouth after the denture teeth have been set in wax. This provides an opportunity to verify the occlusion and visualize the appearance of the finished denture before final processing. Changes needed in the denture tooth arrangement can be made at this time. Figure 5-14 depicts instruments and materials used for complete denture try-in.

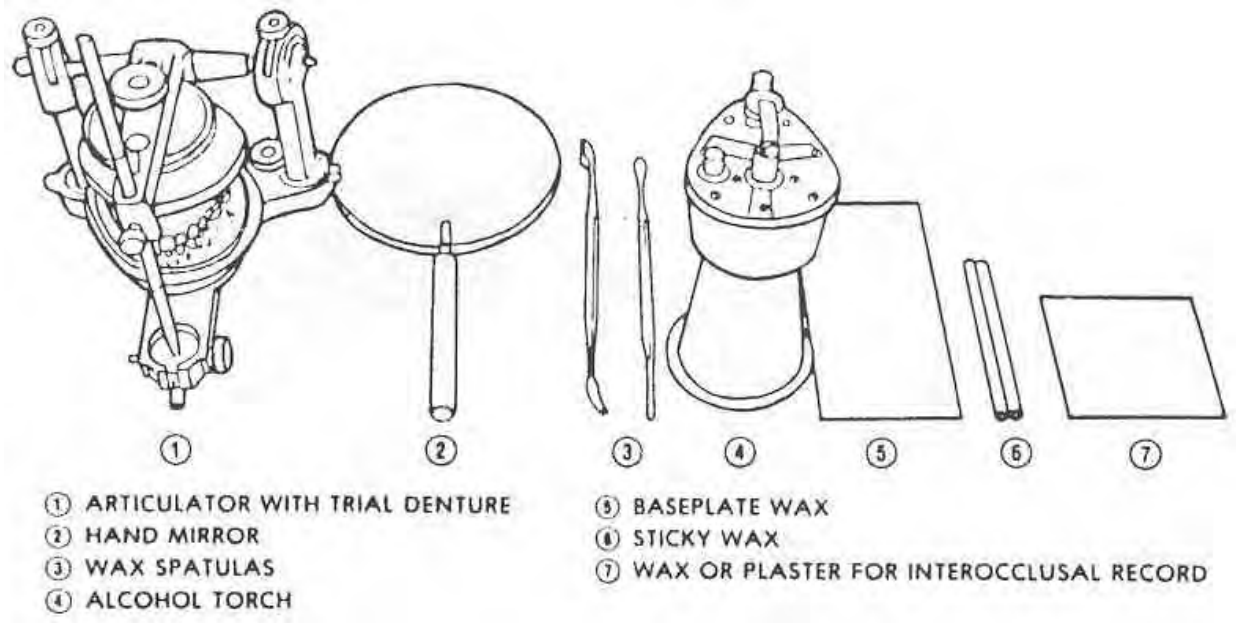


Figure 5-14. Instruments and materials for complete denture try-in.

5-10. COMPLETE DENTURE INSERTION AND ADJUSTMENT

At the time of denture insertion, minor corrections in occlusion may be necessary or the denture base may require grinding and polishing. The patient is instructed in the use and care of his dentures and a subsequent appointment is given for observation and evaluation. Many Prosthodontic Sections have printed instructions for denture patients. If these are used, the dental specialist should have a copy ready for the patient. Figure 5-15 depicts instruments and materials used for insertion of complete dentures.

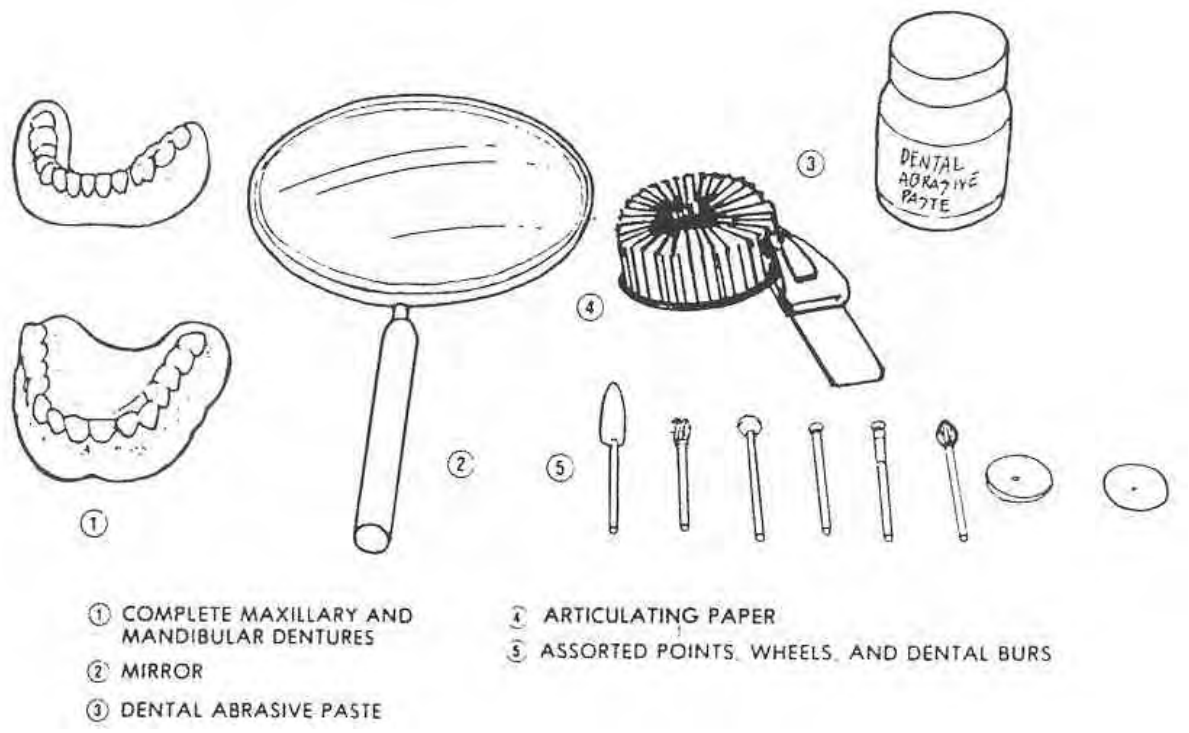

DENTAL ABRAZIVE PASTE
① COMPLETE MAXILLARY AND MANDIBULAR DENTURES
② MIRROR
③ DENTAL ABRASIVE PASTE
④ ARTICULATING PAPER
⑤ ASSORTED POINTS, WHEELS, AND DENTAL BURS

Figure 5-15. Instruments and materials for insertion of complete dentures.

5-11. IMMEDIATE DENTURES

This procedure usually gives the patient the advantage of retaining his natural anterior teeth until the denture is ready for insertion. Having natural teeth to use as a guide in selecting and arranging denture teeth and in determining relationships between the maxilla and mandible is often useful to the dental officer. The sequence of procedures followed in the fabrication of immediate dentures is similar to that described for other dentures. The extraction of the remaining teeth and insertion of the immediate denture are usually performed in the oral surgery section.

5-12. REMOVABLE PARTIAL DENTURES

a. **Procedure**. The variations in design and techniques used in the fabrication of removable partial dentures make it impossible to outline standard procedures. One procedure frequently used is described below.

(1) In planning the fabrication of a removable partial denture, a thorough examination should be done to include a radiographic examination and making diagnostic casts. After this examination, the patient is evaluated and the treatment plan is started. Next, the teeth are prepared so that they will provide a favorable foundation for the denture and provide an accurate impression. Jaw relationship registrations are taken to transfer from the patient to the articulator the positions and information necessary to fabricate the dentures. An appointment may be given for a try-in of the trial denture or the try-in of the metal framework.

(2) On the next appointment, the denture is inserted after fit and occlusion have been verified and adjusted. The patient is instructed in the use and care of the denture. Other appointments may be given as needed for further adjustments.

b. **Impressions**. An irreversible hydrocolloid or polysulfide base impression material is used in making impressions for removable partial dentures. The instruments and materials used are the same for removable partial dentures as for complete dentures. See figures 5-10, 5-11, and 5-12.

c. **Dental Specialist's Duties**. The dental specialist prepares the impression tray in accordance with the dental officer's instructions, mixes the impression material according to the manufacturer's directions, and may fill the tray with the mixed impression material. When the impression has been removed from the patient's mouth, the dental specialist cleans any impression material from the patient's face and lips. For care and handling of the impression, see paragraph 5-7b.

d. **Jaw Relationship Records**. Frequently there are enough remaining teeth to determine the proper relationship for mounting casts on an articulator. If insufficient teeth remain for this purpose, baseplates adapted to edentulous areas of the cast and fitted with properly contoured compound or wax occlusion rims may be used to record relationships in the mouth. Denture tooth shades and mold desired may be selected at this appointment. Figure 5-16 depicts instruments and materials used for jaw relationship records in removable partial denture fabrication.

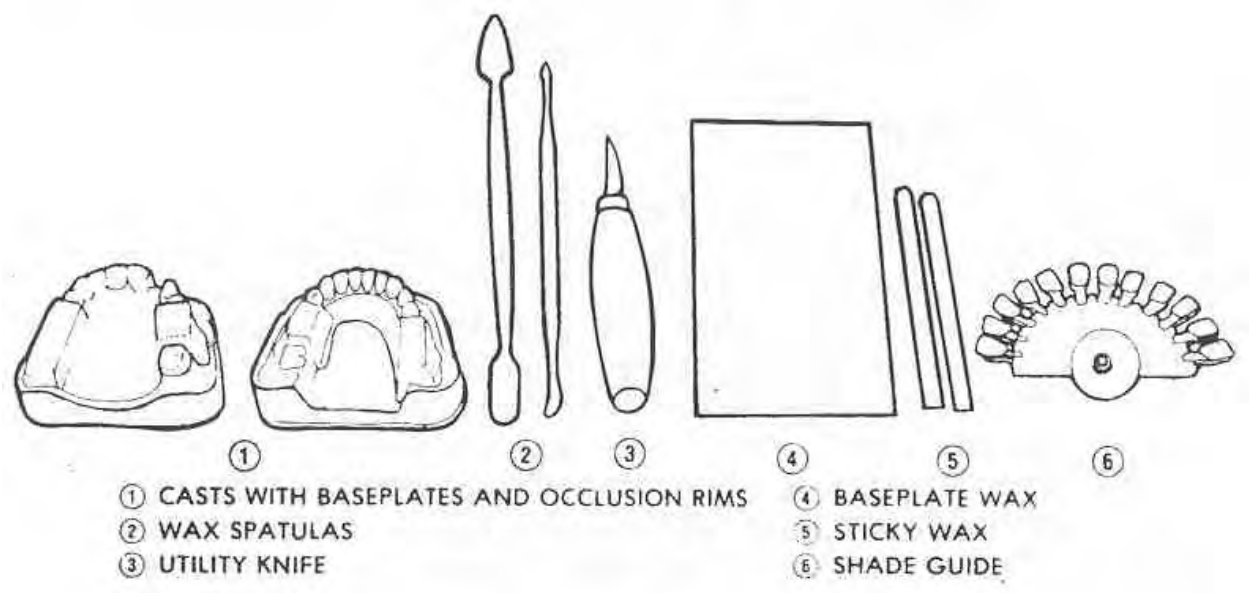


Figure 5-16. Instruments and materials for jaw relationship records in removable partial denture fabrication.

e. **Insertion and Adjustments**. At the time of denture insertion, any minor corrections are made and the patient is given instructions in the use and care of the dentures. An appointment may be given for further adjustments.

5-13. DENTURE REPAIR, RELINE, AND REBASE

It may become necessary to repair, reline, or rebase dentures. Clinical aspects for these procedures vary and the assistance required by the dental specialist will be as directed by the dental officer.

a. **Repair**. Dentures occasionally require repairing. Some repairs may be done without seating the denture in the mouth. Other repairs will require that an impression be made of the dental arch with the denture in place so that a cast can be made with denture properly related to the teeth and supporting tissues.

b. **Reline**. Relining of dentures is a process of replacing the tissue surface of the dentures to compensate for changes in the supporting structure.

c. **Rebase**. Rebasing is a procedure in which the denture base material is replaced by new material.

5-14. LABORATORY PROCEDURES

In the absence of a dental laboratory specialist, the dental specialist in prosthodontics may be required to perform laboratory duties such as pouring impressions, adapting baseplates, performing minor repairs, and polishing dentures. All impressions must be prepared and poured in an appropriate material within a few minutes after removal from the mouth. These procedures are described in TC 8-226. When prosthetic cases are ready for fabrication in the laboratory, the dental specialist should complete the administrative section of DD Form 2322 (Dental Laboratory Work Authorization) accompanying the case. The prosthesis design and other details included on this form should be completed by the dental officer.

5-15. AREA DENTAL LAB

TB MED 148 outlines prosthodontic services provided by the Area Dental Lab (ADL). TB MED 148 also tells how to prepare cases sent to the ADL. The dental specialist or dental laboratory specialist must be familiar with the provisions in TB MED 148 and follow the instructions explicitly.

Continue with Exercises

EXERCISES, LESSON 5

INSTRUCTIONS. The following exercises are to be answered by marking the lettered response that best answers the question or best completes the sentence or by following the special instructions.

After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers.

SPECIAL INSTRUCTIONS. For exercise items 1 through 8, match the definition or characteristic in column A with the appropriate prosthodontic term in column B. Items in column B may be used more than once.

Column A			Column B
1.	____	An extension from a prosthesis that affords vertical support for a restoration.	a. Abutment.
2.	____	An occluding surface built on a denture base to make records showing jaw relationship.	b. Rest.
3.	____	A tooth used for the support of a fixed prosthesis.	c. Baseplate.
4.	____	Made of plaster of Paris or artificial stone.	d. Denture base.
5.	____	A temporary form representing the base of the denture used for trial insertion.	e. Cast.
6.	____	That part of a denture to which denture teeth are attached.	f. Impression.
7.	____	A positive reproduction of the form of the tissues of the maxillae or mandible.	g. Occlusal rim.
8.	____	A negative form of the tooth.	

9. Dentulous impression trays:

   a. Can be cut and bent to fit the patient.

   b. Are available in only small medium, and large.

   c. Are made with rimmed borders to retain the impression material.

   d. Are used when no teeth remain in the arch.

SPECIAL INSTRUCTIONS. For exercise items 10 through 15, match the characteristic in column A with the appropriate instrument in column B.

	Column A	Column B
10. ____	Also called a millimeter gauge.	a. Alcohol torch.
11. ____	Mechanical device used to indicate the relative horizontal position of the mandible to the maxilla.	b. Compound heater.
12. ____	Used to apply heat to small localized areas.	c. Articulator.
13. ____	Electrically operated, used to soften modeling plastic.	d. Vernier caliper.
14. ____	Used to register the positional relationship of the maxillae to the temporomandibular joints.	e. Face bow.
15. ____	Mechanical device which represents temporomandibular joints and jaw members.	f. Needle point tracer.

16. The face bow is fitted with an:

   a. Gothic arch tracer.

   b. Bite fork.

   c. Articulator.

   d. Impression tray.

17. If the procedures for complete denture fabrication are correctly followed, which of the following will be performed **LAST**?

    a. Preliminary impressions are made.

    b. Jaw relationship registrations are made.

    c. Trial denture is evaluated in the patient's mouth.

    d. Final impressions are completed.

    e. The dentures are adjusted for fit and occlusion.

18. Preliminary impressions of complete dentures are fabricated from:

    a. Modeling plastic.

    b. Irreversible hydrocolloid.

    c. Plaster of Paris.

    d. a and b above.

    e. a or b or c above.

19. For final impressions for complete dentures, _____ is (are) commonly used.

    a. Plaster of Paris.

    b. Metallic oxide impression paste.

    c. Polysulfide base.

    d. b and c above.

    e. a or b or c above.

20. Information concerning the services provided by the Area Dental Lab (ADL) is found in:

    a. TB MED 148.

    b. TB MED 250.

    c. TC 8-226.

    d. FM B-225.

21. In prosthodontic therapy, immediate dentures:

    a. Allow the patient to keep all his teeth until the dentures are ready for insertion.

    b. Do not require jaw relationship registrations.

    c. Are usually inserted in the oral surgery section.

    d. Have impressions made which are washed with warm slurry water.

22. Which of the following items must appear in the setup for impressions for removable partial dentures?

    a. Utility wax.

    b. Sticky wax.

    c. Articulator paper.

    d. Shade guide.

    e. "b" and "d" above.

23. Complete denture fabrication requires additional procedures for preliminary impressions NOT required by partial denture fabrication.

    a. True.

    b. False.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 5

1. b (para 5-2p)
2. g (para 5-2n)
3. a (para 5-2a)
4. e (para 5-2d)
5. c (para 5-2c)
6. d (para 5-2h)
7 e (para 5 2d)
8. f (para 5-2k)
9. c (para 5-4a(2))
10. d (para 5-4g)
11. f (para 5-4j)
12. a (para 5-4b)
13. b (para 5-4c)
14. e (para 5-4i)
15. c (para 5-4h)
16. b (para 5-4i)
17. e (paras 5-7a, 5-10)
18. d (paras 5-7b(1)(a), (b))
19. d (para 5-7b(2))
20. a (para 5-15)
21. c (para 5-11)
22. a (Figures 5-10, 5-11)
23. b (paras 5-7a, b(1); 5-12b, c)

End of Lesson 5

APPENDIX A

TYPICAL INSTRUMENT SETUPS

Listed below are some typical instrument setups for the various dental procedures:

Basic Examination Setup

1. Mouth mirror
2. Explorer
3. Periodontal probe
4. Cotton forceps
5. 2" x 2" gauze sponges

Anesthetic Setup

1. Topical anesthetic
2. 2" x 2" gauze sponges or cotton-tip applicator
3. Assembled aspirating syringe
   a. Syringe
   b. Needle for arch to be worked on
   c. Carpule with barb seated

Rubber Dam Instrument Setup

1. Mouth mirror
2. Explorer #23
3. Rubber dam material
4. Rubber dam stamp
5. Rubber dam punch
6. Rubber dam clamp
7. Rubber dam clamp forceps
8. Rubber dam frame
9. Dental floss
10. Suture scissors (blunt nose)
11. Stellite #1-2

Restorative Setups

1. Base and amalgam

    a. Burs
    b. Excavators - matched pair
    c. Hatchets - matched pair
    d. Gingival margin trimmers - matched pair
    e. Chisel - paired only with Wederstaedt #41 and #42
    f. Mixing pad
    g. Base material
    h. Ladmore #3 plugger or Dycal instrument
    i. Assembled Tofflemire matrix and band for correct arch
    j. Wooden wedges
    k. Amalgam carrier
    l. Amalgam pluggers
    m. Carvers #89 and #92 or Tanner 5T
    n. Carver, Hollenback #3
    o. Articulating paper

2. Base and composite resin

    a. Burs
    b. Excavators - pair
    c. Hatchet #17 or #53, #54
    d. Chisel - paired only with Wedelstaedt #41 and #42
    e. Mixing pad
    f. Base material
    g. Ladmore #3 plugger or Dycal instrument
    h. Matrix material
        (1) Celluloid strip and wedge (proximal)
        (2) Cervical matrix (facial)
        (3) Crown form (incisal edge)
    i. Plastic placing instrument
    j. Finishing material
        (1) Cuttlefish strip (proximal)
        (2) Sandpaper disc and mandrel (facial, incisal)
    k. Surgical knife

Surgical Setups

1. Basic setup

    a. Forceps holding air
    b. Instrument forceps (in jar)
    c. Periosteal elevator - Molt #9
    d. Root elevators - 34S and 301
    e. Extracting forceps - appropriate one
    f. 2" x 2" gauze sponges

2. Supplementary items determined by procedure, as well as preference of dental officer

    a. Oral surgical burs
    b. Surgical knife
    c. Apical fragment root elevators - paired for posterior
    d. Curettes - paired for posterior
    e. Rongeur
    f. Surgical scissors
    g. Suture material
    h. Suture scissors
    i. Bone file
    j. Gingival retractors
    k. Oral surgical mallet
    l. Oral surgical chisel
    m. Dental surgical burs
    n. Apical fragment root elevators
    o. Iodoform impregnated gauze

Routine Tooth Extraction Setup

(Same as Basic Surgical Setup)

Endodontic Instrument Setups

1. Basic setup

    a. Dappen dishes for different medications needed
    b. Burs - assorted long shank
    c. Glass irrigating syringes
    d. Cotton pellets
    e. Broaches
    f. Broach holder
    g. Files
    h. Reamers
    i. Paper absorbent points
    j. Rule
    k. Temporary stopping
    l. Plastic filling instrument
    m. Endodontic explorer
    n. Excavator
    o. Cotton pliers

2. Endodontic filling - tray setup

    a. Paper points
    b. Sealer
    c. Zinc phosphate powder/liquid
    d. Glass irrigating syringes
    e. Gutta-percha and silver points
    f. Root canal pluggers and spreaders
    g. Hemostat
    h. Plastic instrument
    i. Spatula
    j. Glass slab

End of Appendix A

APPENDIX B

LIST OF INSTRUMENTS USED IN RESTORATIVE PROCEDURES

The following is a list of instruments appropriate for each step of the restorative procedure:

1. Removing decay:

    a. Darby-Perry excavators 5 & 6 (10 Series)
    b. Darby-Perry excavators 21 & 22 (20 Series)
    c. Black's excavators 63, 64, (large); 56, 66 (small) (60 Series)

2. Finishing the cavity preparation:

    a. Bi-beveled hatchet number 17
    b. Mono-beveled hatchets numbers 51 and 52 (large pair); numbers 53 and 54 (small pair) (50 Series)
    c. Bin-angled chisels numers 81 and 83 (80 Series)
    d. Straight chisels numbers 84, 85, and 86 (80 Series)
    e. Wedelstaedt chisels numbers 41 and 42 (4-0 Series)
    f. Gingival margin trimmers numbers 77,78; 79, and 80 (70 Series)

3. Preparing and placing the base material:

    a. Glass slab or mixing pad
    b. Stainless steel spatula
    c. Ladmore plugger number 3
    d. Woodson pluggers numbers 1, 2, and 3
    e. Dycal instrument

4. Confining the restorative material in cavity preparation

    a. Amalgam

        (1) Tofflemire matrix retainer
        (2) Tofflemire matrix band number 1 (Universal)

    b. Resins

        (1) Celluloid matrix (for proximal restorations)
        (2) Cervical matrix retainer (facial and lingual restorations)
        (3) Celluloid crown forms (for specific teeth for Class IV resin restorations)

c. Intermediate Restorative Material

(1) Tofflemire matrix retainer (posterior)
(2) Celluloid matrix (anterior)

5. Preparing and placing of the restorative material

a. Amalgam

(1) Amalgam carrier
(2) Black's pluggers number 1 and number 2

b. Composite resins

(1) Mixing equipment furnished with the restorative materials
(2) Plastic placing instrument

c. Acrylic

(1) Stainless steel spatula
(2) Medicament (Dappen) dish
(3) Plugger (dental officer's preference)
(4) Sable brush (for brush-bead technique)

d. IRM

(1) Stainless steel spatula
(2) Parchment pad
(3) Plugger (dental officer's preference)

6. Finishing the restorative material

a. Amalgam

(1) Tanner 5T
(2) Hollenback number 3
(3) Cleoid number 92
(4) Discoid number 89
(5) Articulating paper
(6) Finishing burs

b. Composite resins

(1) Surgical knife
(2) Finishing burs (12 fluted carbide only)
(3) Diamond points and wheels
(4) White and green stones
(5) Cuttlefish finishing strips
(6) Sandpaper disks

c. Acrylic

(1) Surgical knife
(2) Cuttlefish strips (for proximal restorations)
(3) Sandpaper disk on snaphead mandrel (facial and lingual restorations)

d. Intermediate Restorative Material

(1) Amalgam carvers
(2) Number 8 round bur

End of Appendix B